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COMMONWEALTH OF VIRGINIA
DEPARTMENT OF AGRICULTURE AND IMMIGRATION
G. W. KOINER, Commissioner

IN COOPERATION WITH THE DEPARTMENT OF AGRICULTURE,
FOREST SERVICE, HENRY S. GRAVES, FORESTER

WOOD-USING INDUSTRIES OF VIRGINIA

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By
ROGER E. SIMMONS
Statistician in Forest Products

Printed under the direction of the
AMERICAN FORESTRY ASSOCIATION
1912

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NOTICE

The investigation upon which this report is based was undertaken by the Forest Service in co-operation with the Commonwealth of Virginia, the work being done under the direction of O. T. Swan, Engineer in Forest Products, Chief of the Office of Wood Utilization, United States Department of Agriculture, Washington, D. C. The statistics were compiled from data collected in 1911, covering a period of one year.

WOOD-USING INDUSTRIES OF VIRGINIA.

PREFACE

Virginia, the oldest State in the Union, is probably the oldest lumbering region. Since colonial days the forests have been meeting a large demand in lumber and logs for export to European and West Indian ports, besides supplying the home needs of a well-populated and a rapidly growing State. With the early commercial development of the nation, beause the Virginia forests were closer than those of any other yellow-pine States to the large consuming centers and lumber markets of Boston, New York, Philadelphia and Baltimore, they naturally were among the first to be exploited; since then they have been sending forth increasing annual supplies. This exportation was made possible before the advent of railroads by the easy navigation of the large rivers, with their many branches which traverse the State, and by the excellent deep harbors with which the coast is indented.

For more than sixty years lumbering has been actively carried on in Virginia, and for the past twenty-five years on an extensive scale. It could hardly be expected, therefore, that forests which have been for so long a time subject to an increasing drain, would still be able to compete in production with those States in which lumbering started many years afterward. The statistics of the Bureau of the Census for 1909 showed, however, that only five other States exceeded the lumber cut of Virginia. Four of these were yellow-pine States, the other was Washington, holding the lead through its Douglas fir, while the other Eastern, New England, and Ohio Valley States whose cut in the late years, according to statistics, has been showing a gradual decrease, this oldest lumber State has been constantly moving upward in its maximum yield and in 1909 produced over two billion feet. This was 119 per cent. more than the quantity of lumber cut ten years before, and no other yellow pine State, except Louisiana, showed so large a relative gain. The increase from 1890 to 1900 was a little more than 200 per cent, while the gain from 1880 to 1890 was approximately 76 per cent.

Owing to the diversified soil and surface conditions of Virginia in the gradual transition from the tidewater section to the high mountain ranges in the western part of the State, the forested area is composed of many kinds of merchantable timber. It is natural, therefore, that Virginia should take a prominent stand, not only in the supply of

softwoods, such as the pines—including white pine—the cedar, cypress, hemlock and spruce, but also in the production of hardwoods, such as oak, hickory, ash, yellow poplar, gum and chestnut.

Except on the mountain sides, Virginia forests are not large unbroken areas of timbered land as in the more Southern and far Western States. Farm forests and cultivated fields checker the surface. These farm forests comprise two thirds of the fifteen million acres which is the estimated forest area of the State. In many Eastern States the forests have been so often culled and cut over that the remaining wood lots are merely a forest cover of young growth with a few larger trees capable of supplying only the needs of the farm for fire wood and material for fence repair. This is not the case in Virginia. According to a silvicultural study recently made by the Forest Service, a large proportion of these farm lots are well wooded with merchantable trees, and if given proper care and protection, it is pointed out, will be capable of sustaining Virginia's maximum lumber yield. The standing timber, according to a rough estimate by the Forest Service in 1909, amounted to thirty billion feet. With the exception of two and one-half billion owned by lumber companies, all of the remainder is included in the area covered by farm forests.

In the pine region in the Southeastern part of the State there are extensive modern sawmill plants which manufacture a large portion of the lumber produced in Virginia. Besides these there are numerous small sawmills and portable mills operating on wood lots and cutting the hardwoods in the foothills and mountain regions. The census report for 1909 showed Virginia had in active operation 3,511 mills, which was a greater number than that shown by any of the other forty-eight States; Louisiana, for instance, produced 1,400,000 feet more than Virginia and had in operation only 656 mills. In Arkansas, where the cut was almost equal to that of Virginia, there were 1,500 fewer mills.

Besides these 3,511 sawmills in Virginia, there are a number of subordinate wood using industries. A large portion of these take the lumber from the sawmills and convert it into such finished products as furniture, boxes, vehicles, cars and ships. Other mills take wood in the form of bolts or logs and make them direct into finished products like insulator pins, excelsior, hubs, spokes, handles, etc. It is with the raw material of all these industries that this report is solely concerned.

SCOPE AND PURPOSE OF STUDY

An annual record of the output of the State's sawmills is being kept; but what becomes of this lumber? Into what channels of use-

ILLUSTRATION I. A BAND MILL SAWING PINE IN THE TIDEWATER REGION.

fulness it goes has not been shown by any report prior to this. It is interesting and instructive to ascertain what part of the rough lumber is being kept at home and manufactured into finished commodities, and what part is shipped out of the State in the rough. With Virginia's rich and varied forest resources, is any part of the manufacturer's needs for raw material met by wood grown outside of the State; and, if so, what are the principal kinds and their qualities? While the general and most important uses of various woods are known, this report goes further and points out specific uses and tells the properties of the wood which commend it for these uses. However, it is not the purpose of this study to show what becomes of the entire lumber cut. The portion being sent elsewhere is not taken into consideration here, since its manufacture in other States belongs to studies similar to this, which have been, or will be, made in those States.

Much of the lumber remaining at home is used in its rough form with no further change than mere trimming and mortising to fit it for the place desired, as in the construction of houses, bridges, tunnel linings, forms, scaffolding, fencing, and walks. This material is not taken into account in this study; nor is any wood not used as raw material in wood-using factories; hence products such as railroad ties, wire poles, mine props, firewood, piling, fence posts, shingles and laths are excluded. No space is given to commodities shipped into Virginia already manufactured, as, for example, flooring and inside finish from the longleaf-pine States, the Lake States, and West Virginia, vehicles and graphophones from New Jersey, white-pine freezers from New England, pianos, from Maryland and Illinois, organs from Massachusetts and Maryland and Vermont, sewing machines from New Jersey and Connecticut, and tanks and farm machinery from various other States. In some instances these ready-made commodities may have been made wholly or in part from lumber cut from Virginia forests and shipped out as rough lumber and then brought back after being further manufactured to be sold to the consumer. Examples of this were noted in parquetry flooring, furniture, caskets, coffins, agricultural implements and vehicles.

The investigative work of this study was done by the Forest Service, U. S. Department of Agriculture in co-operation with the Commissioner of Agriculture and Immigration of the State of Virginia. Many of the reports which furnished the data were forwarded by manufacturers directly to the Forest Service in response to inquiries made by mail. The field work consisted in the collection of information by special agents. This required visits to factories throughout the State where not only was sought information as to output but as to

methods of manufacture and uses of wood. The information sought was: kinds of wood used; the quantity required annually; the cost at the factory; the specific uses of each kind; size and grade of lumber; whether the raw material was grown in Virginia, or States nearby, or at a distance, and what efforts had been made to utilize waste material.

Aside from the general interest which naturally pertains to a study of this character, supplying, as it does, information which no other report has given, it will prove practical and valuable in many ways. It should stimulate trade by bringing together buyer and seller, as it shows the kinds of wood the manufacturers desire to buy and offers valuable suggestions to the large timber owners, to the farmers with a few scattered trees, and to the sawmill men where to sell their material. Mention is made also of the many advantages which the State offers wood-using industries to locate within her borders. The uses of woods which heretofore have been of little commercial value are pointed out and the qualities which commend them for other uses are discussed. To the manufacturer who finds home-grown material difficult to secure, this report points out other States whose forests will most likely supply his need. The merchant's attention is called to products which wood-using industries of Virginia have to sell and the people of the State are shown the necessity of Virginia taking steps looking to the improvement and perpetuation of her forests by adopting an intelligent forest policy.

AN IMPORTANT POINT

Forest policies do not receive the popular support they should because the results are not immediate. State legislatures are prone to regard recommendations for adopting forestry as academic instead of practical. This report brings the subject close to the business men of the State, and points out conditions, which, if taken advantage of, will secure greater industrial prosperity, and if neglected, will probably result in loss and commercial depression.

Virginia's sawmills produced, according to the last decennial census, more than 2,100,000,000 feet of lumber. The figures of this report show (see Table No. 2) that the wood using industries further manufactured about 450,000,000 feet of home grown wood, or only a little more than one-quarter of the cut. This means that the difference, 1,550,000,000 feet, except for the rough lumber needed to supply the State, is shipped away to meet the demands of, and to be manufactured by, the industries of other States. If the industries of Virginia are not taking advantage of the excellent geographical location of their State in being close to markets and of their valuable

forest and water transportation resources in further manufacturing as much of their rough lumber as they might, it would be well to recognize the fact and to take measures to profit by it.

Besides the 2,100,000,000 feet which Virginia's sawmills produce annually, and 20,000,000 feet cut into veneer, it requires 257,000,000 feet of forest material for the makers of slack staves and heading, and 13,000,000 feet for the manufacturers of tight cooperage stock. The aggregate amounts to nearly 2,390,000,000 feet, which does not include the drain on the forests for such products as cross-ties, pulpwood, mining props, and telegraph poles. Arbitrarily fixing the quantity for these at 300,000,000 feet, the total amount of wood contributed annually by Virginia's forests would aggregate approximately 2,690,000,000, feet. Expressed in dollars and cents this amounts to more than $25,500,000, making the value of the annual timber crop to exceed the combined values of the tobacco and wheat crops, and equal to considerably more than two-thirds of the corn crop as reported by the Department of Agriculture for 1910. With agriculture, therefore, Virginia's forests are one of her greatest sources of wealth.

The following pages show that the wood-using industries take a part of this lumber after the saw mills lay it down, and by additional manufacture further add to the commercial activity and prosperity of the State by making commodities of greatly increased value. This added value is estimated to be more than $10,000,000, making the forest products worth over $35,000,000. In 1911 wood-using factories paid over $20,000,000 alone for their raw material, and according to the last Census their total capitalization, together with the sawmills, amounted approximately to $25,000,000. If the timber is allowed to disappear, the life of these industries, and of the sawmills which are dependent upon the forests for their raw material, is limited; and if measures are not taken to insure the continued growth and protection of the forests, the industries will ultimately have to shut down, and the State will suffer from the consequent loss of business. Nearly every year fire rages in Virginia's forests and the annual loss to the State is not less than $350,000. The forests cover an area of 15 million acres or equal to one-half of that of the State and are estimated to be worth over $100,000,000.

A large part of these areas are better suited for growing harwood or softwood timber than for farm crops. The State, therefore, can profitably grow as well as manufacture timber. Virginia can maintain its present lumber yield and at the same time furnish cheap raw material to factories. This will not only insure a continuance of the present industrial activity, but an even

greater prosperity than that which the Virginia sawmills and the wood-using industries at this time are responsible for. The State, therefore, should promptly recognize, not only the great value of its forests, but enact legislation to establish an adequate forest policy. Such a policy should include:

(1) The establishment of a non-partisan forest department whose majority membership will include such officials as the State Geologist, the Commissioner of Agriculture, the Director of the Agricultural Experiment Station, and the President of the State University;

(2) The appointment of a technically trained forester to take charge of all forest work in the State subject to the supervision of the Department;

(3) A fire protective system having adequate funds at its disposal, which would bring Virginia under the provisions of Section 2 of the Weeks Law and provide Federal aid in protecting from fire the forested watersheds of its navigable streams.

SPECIES.

Varying quantities from fifty-two species made up the 894,000,000 feet of lumber used by the Virginia wood users. These species are listed in Table I, which gives the common English name as well as the proper botanical name, according to the Check List of the Forest Service.

An earnest effort was made to differentiate all the separate species, because this enables one more easily to study uses according to inherent properties. It is of far greater value to know the exact woods as loblolly pine and Cuban or "slash" pine, white oak or yellow oak, red cedar or white cedar, than to have merely the generic name as pine, oak or cedar. This effort was only partially successful, since the task was very difficult for several reasons: First, from the confusion of the vernacular or common names of woods; a manufacturer in Virginia orders pitch pine, meaning longleaf; the mill man in Florida fills the order by sending Cuban or "slash" pine, as this pine is sometimes called pitch pine in Florida. In some localities Virginia pine means shortleaf pine; in others loblolly pine; but on the market it may include both shortleaf and loblolly; whitewood in New Hampshire is yellow popular but tulip-tree wood in Virginia, and similar confusions exist with very many other woods. Second, it is difficult for the layman to always correctly identify wood in the form of lumber. While timbermen can differentiate trees in the field, when the tree is cut into lumber and sent to the manufacturer it is a different matter. White oak, chestnut or "rock" oak, and bur oak are sold

mixed together and accepted by the manufacturer as white oak; scarlet oak and Spanish oak, in trade, are not distinguishable from red oak. Third, in a number of instances the manufacturer finds the kind of wood, independent of the species, suitable for his needs and therefore is indifferent to the species he uses. Examples of this are found in the reports of the users of the elms, hickories and ashes.

In this study, therefore, the effort made to separate the species was carried out only so far as the separation was practical in accordance with wood uses. In Table I, all kinds of wood used by the Virginia manufacturers have been brought together; some are listed according to the generic name only, but many according to species. The quantity shown for each is not exact because of the difficulties named above. In a number of cases the determination of a species was made more or less arbitrary. The particular use of the wood, the location where it was cut, information gathered in the field from timbermen and others better versed than the manufacturer, and identification by men gathering the information were the principal factors governing the decisions. The results, therefore, as shown in the table may be accepted as approximately correct.

Seven species of yellow pine are cut for lumber in the United States. The statistics of the Bureau of the Census grouped them as yellow pine. Of these, four are native to Virginia and appear in Table I in quantity ahead of all other kinds of wood. They are loblolly pine, shortleaf pine, longleaf pine and scrub pine.

TABLE I.—SUMMARY, KINDS OF WOOD USED IN VIRGINIA.

KIND OF WOOD.		Quantity used annually		Average cost per 1,000 ft.	Total cost f. o. b. factory
Common Name.	Botanical Name.	Feet B. M.	Per cent		
Loblolly pine	(Pinus taeda)	389,257,088	43.50	$ 12.77	$ 4,961,017.96
Shortleaf pine	(Pinus echinata)	182,369,615	20.40	13.26	2,417,980.10
Longleaf pine	(Pinus palustris)	74,762,206	8.40	20.26	1,515,553.23
Scrub pine	(Pinus virginiana)	44,243,500	4.90	10.99	486,526.86
White Oak	(Quercus alba)	35,467,028	4.00	22.05	782,144.11
Red gum	(Liquidambar styraciflua)	31,594,290	3.50	13.31	420,462.58
Yellow poplar	(Liriodendron tulipifera)	27,848,547	3.10	18.58	517,294.25
Red Oak	(Quercus rubra)	19,984,500	2.20	20.75	413,284.50
Cotton gum (tupelo)	(Nyssa aquatica)	14,951,000	1.70	9.65	144,937.50
White pine	(Pinus strobus)	13,954,529	1.60	27.00	376,403.04
Cypress	(Taxodium distichum)	8,985,518	1.10	26.07	234,275.24
White cedar	(Chamaecyparis thyoides)	8,290,113	.90	18.68	154,916.15
Hickory	(Hicoria alba)	7,666.245	.90	31.38	240,612.80
Chestnut	(Castanea dentata)	7,115,896	.80	13.43	95,576.95
Black gum	(Nyssa sylvatica)	6,444,190	.70	11.47	81,277.75
Ash	(Fraxinus Americana)	4,182,403	.50	24.30	101,628.93
Locust	(Robinia pseudacacia)	2,279,000	.20	22.90	52,200.00
Sugar maple	(Acer saccharum)	2,236,350	.30	20.62	46,107.25
Beech	(Fagus atropunicea)	1,946,000	.20	17.98	34,995.50
Sycamore	(Platanus occidentalis)	1,769,000	.20	24.83	50,580.00
Basswood	(Tilia americana)	1,591,900	.20	18.80	29,934.50
Black oak	(Quercus velutina)	1,065,000	.10	19.18	20,430.00
Sweet birch	(Betula lenta)	986,000	.10	32.28	31,826.00
Spruce	(Picea rubens)	952,025	.10	24.07	22,922.65
Cottonwood	(Populus deltoides)	754,026	*	22.62	17,161.04
Hemlock	(Tsuga canadensis)	734,000	*	11.63	8,535.00
Dogwood	(Cornus florida)	733,400	*	14.18	10,392.40
Douglas fir	(Pseudotsuga taxifolia)	609,736	*	58.08	35,427.87
Mahogany	(Swietenia mahagoni)	426,358	*	146.86	62,364.00
Slippery (rock) elm	(Ulmus pubescens)	292,581	*	33.23	9,704.28
Black walnut	(Juglans nigra)	277,300	*	35.85	9,930.00
Cucumber	(Magnolia acuminata)	162,000	*	17.40	2,820.00
White (soft) elm	(Ulmus americana)	140,000	*	10.14	1,420.00
Cherry	(Prunus serotina)	100,326	*	97.40	9,740.86
Buckeye	(Aesculus glabra)	80,000	*	13.15	1,050.00
Sugar pine	(Pinus lambertiana)	68,000	*	68.38	4,660.00
Red cedar	(Juniperius virginiana)	46,000	*	36.48	1,678.00
Teakwood	(Tectona grandis)	44,059	*	199.09	8,771.80
Butternut	(Juglans cinerea)	17,923	*	51.07	914.30
Persimmon	(Diospyros virginiana)	15,000	*	14.00	210.00
Osage orange	(Toxylon pomiferum)	13,000	*	48.00	624.00
Sassafras	(Sassafras sassafras)	12,000	*	32.00	384.00
Silver maple	(Acer saccharinum)	10,000	*	30.00	300.00
Spanish cedar	(Cedrela odorata)	5,000	*	120.00	600.00
Western red cedar	(Thuja occidentalis)	5,000	*	50.00	250.00
Rosewood	(Dalbergia)	1,400	*	531.00	708.00
African cedar	(Boswellia klaineana)	1,100	*	138.00	151.80
Silver ava	* * * * *	1,000	*	100.00	100.00
Circassian walnut	(Juglans regia)	350	*	190.60	66.75
Jarra	(Eucalyptus marginata)	200	*	200.00	40.00
White mahogany	(Tabebuia donnell smithii)	100	*	100.00	20.00
Philadelphia walnut	(Albizzia procera)	100	*	100.00	20.00
Total		894,441,902	100.00	$15.00	$13,420,921.95

* Less than one tenth of one per cent.

Of the woods used by the manufacturers only seven were reported as coming entirely from Virginia forests. They were scrub pine, yellow or black oak, white (soft) elm, yellow buckeye, persimmon, sassafras, and silver maple. On the other hand, the entire supplies of rock elm, butternut, and osage orange come from other States. These woods are cut in Virginia in quantities more than sufficient to meet the local demands, but the manufacturers evidently found shipped-in woods more convenient. It is significant of the growing scarcity of native, eastern softwoods that three species from

the Pacific Coast States were called on to meet uses in Virginia in competition with the eastern woods. They were Douglas fir, Western red cedar, and sugar pine. Eleven foreign woods were reported, some of them at high prices. The uses of these foreign and all of the domestic woods will be referred to later on in this report, under the discussions of individual industries.

Nearly 45 per cent of the wood used by the Virginia manufacturers was cut from the forests of other States. The principal States and their products are as follows:

Loblolly Pine	North Carolina.
Shortleaf Pine	North Carolina, South Carolina and Georgia.
Longleaf Pine	North Carolina, South Carolina, Florida, Alabama and Georgia.
Red Gum	North Carolina and South Carolina.
Yellow Poplar	North Carolina, West Virginia and Tennessee.
Red Oak	North Carolina, West Virginia and Tennessee.
Cotton Gum (Tupelo)	North Carolina and South Carolina.
Hickory	North Carolina and West Virginia.
Chestnut	North Carolina and West Virginia.
Black Gum	North Carolina.
Southern White Cedar	North Carolina, South Carolina and Florida.
Cypress	North Carolina, South Carolina and Florida.
Ash	North Carolina, West Virginia and Tennessee.
White Pine	North Carolina, West Virginia, Tennessee and Lake States.
Locust	North Carolina and West Virginia.
Sugar Maple	Pennsylvania and Lake States.
Beech	West Virginia.
Sycamore	West Virginia, Indiana and North Carolina.
Sweet Birch	West Virginia and Lake States.
Spruce	West Virginia and North Carolina.
Cottonwood	Ohio and Indiana.
Hemlock	West Virginia.
Dogwood	North Carolina.

Cherry was the most expensive domestic wood, with an average price of $97.40 per thousand board feet. The Pacific Coast woods had the next highest prices and sugar pine led. It was purchased for $68.38. Of the Eastern woods the most expensive was red cedar at $36.48. The price shown for black walnut is surprising. It follows red cedar at an average of $35.85. The cheapest wood was cotton gum, costing $9.65. There is $1.82 difference in the price of cotton gum and black gum. Hemlock is the lowest priced conifer, and white elm next to cotton gum the cheapest hardwood.

STATE GROWN WOODS.

Only a little more than one-half of the material used by the Virginia manufacturers was State grown. This does not mean that the State forests were incapable of furnishing more, because the lumber cut of the Virginia sawmills for 1909 was considerably more than five

times that consumed by the wood users. Several conditions, however, favor the use of shipped-in material. Industries near the borders draw their raw material from nearby localities, irrespective of State boundaries. The railroads entering the large consuming centers of Eastern Virginia from the South, facilitate the use of lumber from Southern States rather than material shipped from the far western part of the State. Virginia sawmills probably secured better markets for their rough lumber in the Northern States than at home, while manufacturers on the other hand purchased more advantageously from sawmills farther South.

Virginia is divided naturally into three well-recognized regions, according to the chacteristic growth of the timber and to soil and surface conditions. They are the Tidewater Region, the Piedmont Region and the Mountain Region. The Tidewater Region is the noted pine section of Virginia, where the first exploitation of the forest began, and from where the largest portion of the lumber credited to Virginia has always been manufactured. Loblolly and shortleaf extensively, and scrub and longleaf pines in infrequent stands, are native of this part of the State. On the lower lands mixed with the pine are gums, water oak, hickory, and in the swamp and inundated areas, willows, cypress and Southern white cedar (juniper) grow. The Piedmont Region presents frequent areas of shortleaf pine standing on the old fields, and in the northern part of this section the scrub pine (*Pinus virginiana*) prevails. Red cedar, oaks, yellow poplar, chestnut, ashes, and hickories, and other miscellaneous hardwoods abound. This region is the principal farming center and the tree stands are confined entirely to farm forests. The Mountain region is mainly a hardwood section and furnishes a large part of the virgin growths still standing in Virginia. The white pine stands belong to this region of the State; but scrub pine is scattered throughout the hardwoods. Red spruce, extending its range from West Virginia, is cut in large quantities in several localities of this region. Table 2 gives the kinds and the amounts in board feet, of the home grown woods, and furnishes a comparison with the woods grown outside of the State as reported by the manufacturers.

ILLUSTRATION II. VIRGINIA LOBLOLLY PINE CUT IN THE COASTAL REGION, SHOWING THE AMOUNT OF SAPWOOD.

ILLUSTRATION III. A SPECIMEN WHITE OAK IN THE HARDWOOD FOREST OF THE MOUNTAIN REGION.

TABLE 2.—SUMMARY, STATE—GROWN AND IMPORTED WOODS.

KIND OF WOOD	Grown in Virginia. Feet B. M.	Grown in Virginia. Per cent	Grown out of Virginia. Feet B. M.	Grown out of Virginia. Per cent	Total quantity used annually Feet B. M	Total quantity used annually Per cent
Ash	3,020,500	72.05	1,161,903	27.95	4,182,403	100
Beech	889,000	57.02	1,057,000	42.98	1,946,000	100
Basswood (linn)	812,700	51.02	779,200	48.98	1,591,900	100
Birch, sweet	250,000	25.68	736,000	74.32	986,000	100
Buckeye	80,000	100.00	.....	.....	80,000	100
Butternut (white walnut)	.....	.....	17,923	100.00	17,923	100
Cedar, red	27,000	53.63	19,000	46.37	46,000	100
Cedar, Southern white	2,668,000	32.18	5,622,113	67.82	8,290,113	100
Cherry	5,000	2.07	95,326	97.93	100,326	100
Chestnut	6,102,264	85.76	1,013,632	14.24	7,115,896	100
Cottonwood	50,000	6.68	704,026	93.32	754,026	100
Cucumber	87,000	53.70	75,000	46.30	162,000	100
Cypress	3,141,700	34.98	5,843,818	65.02	8,985,518	100
Douglas fir	.....	.....	609,736	100.00	609,736	100
Dogwood	703,400	95.50	30,000	4.50	733,400	100
Elm, soft	140,000	100.00	.....	.....	140,000	100
Elm, rock (slippery)	.....	.....	292,581	100.00	292,581	100
Gum, black	3,345,526	54.38	3,098,664	45.62	6,444,190	100
Gum, cotton (Tupelo)	10,843,000	72.25	4,108,000	27.75	14,951,000	100
Hemlock	732,000	99.90	2,000	.10	734,000	100
Hickory	5,203,245	68.21	2,463,000	31.79	7,666,245	100
Locust	1,500,000	60.20	779,000	39.80	2,279,000	100
Mahogany	.....	.....	426,358	100.00	426,358	100
Maple, silver	10,000	100.00	.....	.....	10,000	100
Maple, sugar	1,315,000	65.62	921,350	34.38	2,236,350	100
Oak, black	1,065,000	100.00	.....	.....	1,065,000	100
Oak, red	13,330,000	66.98	6,604,500	33.02	19,934,500	100
Oak, white	23,505,037	66.18	11,961,991	33.82	35,467,028	100
Osage, orange	.....	.....	13,000	100.00	13,000	100
Persimmon	15,000	100.00	.....	.....	15,000	100
Pine, loblolly	242,971,526	62.19	146,285,562	37.81	389,257,088	100
Pine, longleaf	170,000	.22	74,592,206	99.78	74,762,206	100
Pine, scrub	44,243,500	100.00	.....	.....	44,243,500	100
Pine, shortleaf	73,590,615	40.32	108,779,000	59.68	182,369,615	100
Pine, sugar	.....	.....	68,000	100.00	68,000	100
Pine, white	6,850,465	49.23	7,104,064	50.77	13,954,529	100
Red gum	17,283,757	54.27	14,310,533	45.73	31,594,290	100
Sassafras	12,000	100.00	.....	.....	12,000	100
Spruce	280,000	29.49	672,025	70.51	952,025	100
Sycamore	107,000	45.64	1,662,000	54.36	1,769,000	100
Teakwood	.....	.....	44,059	100.00	44,059	100
Walnut, black	228,700	82.26	48,600	17.74	277,300	100
Western red cedar	.....	.....	5,000	100.00	5,000	100
Yellow poplar	19,690,033	70.70	8,158,514	29.30	27,848,547	100
Foreign woods	.....	.....	9,250	100.00	9,250	100
Totals	484,267,968	54.19	410,173,934	45.81	894,441,902	100

A brief account of some of the woods manufactured into commodities in Virginia in the order of the quantity used follows:

LOBLOLLY

More loblolly was reported than the combined amounts of any other five species listed; nearly two-thirds of it was cut in Virginia. This tree grows as far north as Delaware and from there southward it appears in all the Atlantic and Gulf Coast States. In southern and southeast Virginia and northeast North Carolina the original growth of loblolly reaches its maximum development in belts of pure stands. Outside of these belts it is mixed more or less with shortleaf pine. The extent of the loblolly range in Virginia is within sixty miles of the coast. Original growths have in a great measure disappeared, and the second

and third growths now furnish the principal source of lumber. Lands once cultivated and then abandoned by the planters of several generations ago now afford merchantable trees. In the more southern States, where longleaf pine and Cuban "slash" pine are still being cut, loblolly is held in low esteem. Pine marketed and known as North Carolina pine or Virginia pine is composed of nearly 80 per cent loblolly. Of the wood reported for further manufacture, loblolly represented nearly 45 per cent of the total as shown by this report.

SHORTLEAF PINE

In importance to the lumber industry, and in value of its lumber, shortleaf pine it is said is the most valuable softwood in Virginia. The place which this species is taking among the second growth in Virginia marks it as one of the most important timber trees of the future, while original growth is rapidly disappearing large areas of exhausted lands abandoned by farmers have been taken possession of by this tree, and this second growth is the source of most of the shortleaf pine now cut in Virginia. In quantity used by the Virginia manufacturers it stands second. Shortleaf grows sparingly as far north as Staten Island, New York, and once abounded in southern New Jersey, Delaware, and Maryland. It has since practically disappeared in all these States except Maryland, and is now cut for lumber no farther north than Virginia. West of the Mississippi River in northern Louisiana and Arkansas and in Missouri shortleaf reaches its best development and is the most plentiful. The needles of shortleaf are generally much shorter and the cones smaller than those of loblolly pine, and as trees, therefore, they are readily distinguished. It is far different with the wood. The two species closely resemble each other and are difficult to identify. In some grades of their wood they are closely alike in respect to weight, strength, structure, and usefulness.

South of the York River and as far west as Richmond and Petersburg is the zone in Virginia where loblolly pine generally predominates. Narrow belts of shortleaf pine are here also, and in lower lands these pines are associated with hardwoods. North of the York River and throughout the Piedmont region, shortleaf is the ruling conifer. It is most abundant on old fields. Virginia shortleaf pine was probably the first timber made an article of commerce from this country. In colonial days we read of it being shipped to England and West Indies in large consignments.

LONGLEAF PINE

Not much of the yellow pine lumber cut in Virginia is longleaf. as the remaining stand is limited and very scattered. Only 170,000 feet was reported by the manufacturers as home grown, though sufficiently large quantities of it were demanded from other States to give longleaf the rank (see Table I) of third important wood used by the manufacturer. Virginia marks the most northerly limits of the range. Its heaviest stands are found in Louisiana and east Texas where virgin forests are now being cut. It has the longest needles of any of the pines which give the tree its name. Next to white pine its lumber brings the highest average price of any of the conifers.

SCRUB PINE

The superior reproductive power of scrub pine is its most important characteristic. It occurs in original growths on clay ridges sometimes with other yellow pine trees, and is scattered in hardwood forests of the Piedmont and mountain regions. It readily seeds itself and grows on the most sterile soils. On cut over areas it springs up rapidly, with a decided increase but it reproduces best on old fields where it forms thick stands. The common names in different localities are "niger" pine, Jersey pine, bastard pine, river pine and poverty pine, but scrub pine is the name now most widely used. It grows more slowly than loblolly pine or shortleaf pine and in dense stands, only a small portion of the trees reach a size large enough for lumber. It can be readily identified from other yellow pine trees. Cones remain on the tree several years after they drop their seed. It has two slightly twisted needles in a sheath. Loblolly pine has three needles twice as long and shortleaf pine has two and three needles to a sheath but they are straight and slightly longer than scrub pine. In the wood this species is more difficult to distinguish, as in appearance it often resembles the loblolly and shortleaf pine. Usually its many tight knots identify it. Wherever convenient the principal use of scrub pine is for fuel and fence rails. When the trees reach a size large enough for the sawmills the lumber is considered by builders in some localities preferable for structural work like house sills to oldfield loblolly. In Delaware treated scrub pine wood has been used successfully for railroad ties; in Maryland the box makers consume large amounts; while in Virginia, next to the box industry, the excelsior manufacturers consume the most.

WHITE OAK

Oak is abundant in the three regions of Virginia and, according to the botanist, twelve different species are cut for lumber. The manufacturers, however, divide them usually into two groups, white oak and red oak, and this broad classification accounts for not more of the species being shown in the tables of this report. The former class includes the true white oak (*Quercus alba*), chestnut oak, (in some parts of the State called rock oak) bur oak, live oak, cow oak, and post oak. The second group is led by the true red oak (*Quercus rubra*) from which the group gets its name, followed by Spanish oak, scarlet oak, pin oak, black or yellow oak, willow oak, and water and laurel oaks.

The white oak class is more widely demanded by Virginia manufacturers than any of the hardwoods and follows the pines in quantity purchased. The average price was greater than that shown for any of the species of yellow pine and $1.30 more than the red oak class. The forests of the State furnished over 66 per cent of the total. The imported white oak was grown principally in North Carolina and West Virginia, but Indiana and Kentucky sent quantities of high grades, mostly quarter-sawed.

The true white oak tree is the most abundant of Virginia's oak trees. The upper Piedmont and Mountain regions is where the greatest number of stands are found. Chestnut oak, growing chiefly in the mountains, like white oak is one of the most durable of the oaks and for structural purposes is in great demand. The tanners pay high prices for the bark of this tree. The Virginia post oak does not grow to large size and only a small per cent of the stand is cut into lumber. It serves its greatest use as railroad ties. Cow (or basket) oak and live oak which rarely appears are found in eastern Virginia, the cow oaks in swamps with the gums and the live oak on high ground. They form only a small part of the white oak lumber cut and are seldom used by the manufacturers. The wood of these trees being exceedingly durable they are highly desired for structural purposes in exposed and damp situations.

RED GUM

Red gum or sweet gum is most abundant in the Southeastern part of Virginia as it thrives best on the rich soil of bottom lands and swamps. It is not related as the common name indicates to the other gums, black gum, water gum, and cotton gum, though it often associates with them in the forest. The red gum has a starlike leaf and bears its

seeds in rough round balls. The black gum has an oval leaf and bears a small bluish-black fruit containing a single seed. Not many years ago red gum had little value as lumber owing to its tendency to twist and warp when seasoned in the ordinary way. Its first extensive use was for slack-barrel staves and heading. With the introduction of rotary-cut veneer machines it jumped into prominence as an excellent veneer wood and in 1909 red gum furnished nearly three times as much veneer material as any other wood. Improved methods of kiln-drying were afterwards inaugurated and the lumbermen were not long learning to market the lumber successfully and it is now in great demand for a number of uses. The sapwood of red gum is almost white. Commercially it is called sap gum and is usually sold separately from the heartwood to meet different uses. Some trees have a large per cent of sapwood. The heartwood is usually a reddish light brown but in some trees the heartwood is dark brown, attractively mottled, and in color and figure resembles Circassian walnut. When such trees are quarter-sawed, and made into high grade furniture, piano cases, and Venetian blinds, their wood often appears in the market under the names Hazel wood, satin walnut, and California red gum. This wood readily absorbs stain and takes on a high polish. In consequence it is made to imitate mahogany, cherry and oak. The Virginia manufacturers use more red gum than any other hardwood except white oak. Nearly 55 per cent of it is grown in the State.

YELLOW POPLAR

The yellow poplar tree has a tulip-shaped flower which gives it the name of tulip-tree, in many localites. In some localities the wood is known commercially as white wood, notwithstanding a large proportion of the lumber cut from this tree has a greenish-yellow color. The light colored wood of the tree is often sold on the markets as white poplar and the darker as yellow poplar. Botanically it is *Liriodendron tulipifera.* It is in a class by itself having in this country no surviving related species. Its range extends from southern New York to Florida and from the Atlantic Coast to the Mississippi River, with a very small area in southeastern Missouri and adjacent Arkansas. In Virginia it is one of the largest and most valuable trees of the forest and reaches its best development on the mountain slopes where trees have been reported to be from 150 to 190 feet high and from 8 to 10 feet in diameter. It is also cut for lumber in the farm forests of the Piedmont Region, and less frequently in the coastal plains. The Virginia saw-mills reported sawing 114,000,000 feet in 1909 and the wood users consumed in further manufacture less than 27,000,000 feet.

The wood of the tulip tree and of the cucumber so closely resemble each other that they are sold together on the market. Cucumber, however, composes only a small proportion of the lumber, because its stand compared with that of yellow poplar is small. Cucumber. possesses the same soft, fine, easily workable qualities that fit yellow poplar to meet more uses in Virginia than any other hardwood except white oak. Manufacturers in sixteen of the twenty-four industries use yellow poplar.

GUMS

The gums of Virginia are cotton gum, water gum, and black gum. They are members of the dogwood family, and are not related to the red gum. The cotton gum and water gum inhabit the wet lowlands and swamps of the Tidewater Region in company with the cypress and the southern white cedar (juniper). Black gum grows in this section but distant from the others and only on well-drained elevations. Unlike the others black gum ranges westward and northward through the Piedmont Region to the slopes of the Alleghanies. The cotton gum and water gum trees grow side by side and in appearance are easily identified by the thickness of the bark. Cotton gum (*Nyssa aquatica*) has bark one inch or more in thickness, while the bark of water gum (*Nyssa biflora*) seldom exceeds one-fourth inch. Tables I and II show that only two species were reported by the Virginia manufacturers; black gum and cotton gum, the former in greater quantities. Owing to the confusion of common names this classification is not reliable because some call these trees black gum, others call them tupelo, which is cotton gum, while others endeavor to separate them. In Virginia the upland gum (*Nyssa sylvatica*) is seldom cut and delivered to the manufacturers, but what is called "black gum" of the market is water gum. In the wood the three species of gums so closely resemble each other that they are difficult to distinguish from external appearance. Cotton gum wood splits straight and fairly easily, but the wood of water gum and black gum has closely interlaced fibres and is exceedingly difficult to split. Water gum wood has a yellowish hue and is darker than the wood of the black gum. Cotton gum is softer and more easily worked than water gum or black gum.

RED OAK

The true red oak (*Quercus rubra*) reaches large proportions in western and southwestern Virginia and poduces high grades of lumber. Spanish oak is locally called "red oak." It is found in the hill country of the Tidewater section of the State, south (and east) of Richmond.

Scarlet oak grows in the Piedmont and Mountain Regions, but though fairly abundant it seldom grows to a size sufficient to be cut into lumber. Locally it is frequently called Spanish oak. Black or yellow oak ranges throughout the State but mostly in parts closely associated with the scarlet oak. This tree reaches large proportions in Virginia, but its lumber has not been in great demand. Not many years ago this tree was felled only to procure its bark, and the logs frequently left in the woods to decay, having little commercial value. With the increasing scarcity of other and more valuable oaks it is gradually coming into general use. Willow oak is so called because its leaves resemble those of a willow. It does not grow large in Virginia though it is quite abundant along the coast. The manufacturers do not purchase it to any extent except for slack cooperage stock. Laurel and water oak grow only in the Dismal Swamp. Neither of them being important lumber trees were not reported by the manufacturers.

WHITE PINE

The sawmills of Virginia cut 96,000,000 feet of white pine according to the decennial census. That the manufacturers used less than one-fifteenth of this amount and bought over one-half of their needs from supplies cut in other States is quite surprising. North Carolina and Tennessee contributed the largest part of the white pine from the outside but the Lake States shipped in the remainder and usually in the highest grades. None of the New England white pine reached the Virginia wood users and none from the Rocky Mountain States. Sugar pine, however, came in from California. In appearance it resembles white pine and has similar qualities and uses. Only small quantities of it were reported, which is surprising, since the manufacturers paid less for it than for some of the white pine bought from the Lake States. The heaviest stands of Virginia white pine are in the coves in the Appalachian Mountains but it also appears on the foothills associated with the oaks and yellow poplars. Its principal uses in Virginia are for *patterns,* sash and doors and ship building.

CYPRESS

In Virginia cypress grows only in the southeastern coastal part of Virginia and is available now mainly on nearly submerged lands in the Dismal Swamp. Though sixty-one mills report cutting this tree in 1909, the wood users procured nearly 68 per cent of their requirements from other States. South Carolina and Florida furnished the most, and North Carolina and Louisiana the remainder. In Louisiana the

cypress is found in the greatest profusion, exclusive forests of it occupying large areas in swamps along the Mississippi. It is sometimes called bald cypress, owing to its bald appearance when it loses its leaves in winter, and it is the only deciduous coniferous tree which grows in Virginia that is reported in the lumber cut. Cypress is a slow grower. The varied shades of color in cypress wood accounts for the names "red cypress", "yellow cypress" and "black cypress" referred to in different localities. The great durability of cypress and its tendency not to shrink or warp makes it one of the most valuable woods. It is, therefore, preferred for wood work exposed to the weather and submerged at intervals under water. It is the foremost tank wood and is growing in favor with the coopers for making containers of liquors. As cooperage stock or a package for food stuffs it does not impart a flavor nor give coloring to the ingredients.

SOUTHERN WHITE CEDAR

Southern white cedar (*Chamaecyparis thyoides*) is an important Virginia wood for further manufacture. More of it is used than in any other State so far studied. It grows in swamps of the Tidewater section with the cypress, cotton gum, water gum, and red gum, and here it is said to reach its best development. The tree grows along the Atlantic Coast as far north as New England, but it is of little commercial importance above Maryland and southern Delaware. The wood is durable when exposed, especially in damp locations and climates, which accounts for the popularity of white cedar shingles for covering seaside cottages and houses.

HICKORY

Eight species of hickory grow in Virginia and five of these are cut in commercial quantities. Mockernut is probably most common, and grows in all regions, while bitternut, shagbark and small fruited hickories are found in the upper Piedmont and Mountain Regions. Bitternut hickory is the most abundant; the nuts are too bitter to be edible, hence the name. It is probably the most widely distributed member of the hickory family. Shagbark is so named from the tree's bark, which in the older trees hangs down in long strips. This tree yields the best flavored nut of any of the hickories, and its fruit is commonly seen in the markets. The small fruited hickory is far less frequent in Virginia than the other species, and the nuts are too small for commerce but are sweet and delicately flavored. Pignut is the most abundant hickory tree in the northern States; in Virginia it grows in the moun-

tains, seeking higher altitudes than any of the other hickories. Hickory, independent of species, combines more than any other wood, the qualities of strength, elasticity, and toughness. It is, therefore, demanded where these properties are essential, as in vehicle stock, axe, hammer, and pick handles, and sucker rods. Though some species of hickory are more easily identified than those of other trees, the manufacturer and the lumberman rarely makes any distinction.

The young sapling hickories are in almost as great demand as the grown trees. They are cut and sold for hoop poles. It is this cutting of the young growth which if not checked will bring about the early exhaustion of the hickory tree.

CHESTNUT

Virginia is one of the five principal States in the production of chestnut lumber. In 1909 the total cut was 68 million feet though the amount the manufacturers used was only 7 million. Ten per cent of this was shipped in from other States. Only in comparatively recent years has chestunt had high value as lumber; before that it had been used as a substitute for higher priced woods. In the interior trim of houses the conspicuous handsome figure of the chestnut has grown in favor, and to a large degree, supplanted the oak finish. Chestnut lumber is very durable especially in contact with the soil. It is this property which favors its use above other woods for making burial caskets.

The tannin in chestnut wood is extracted and used in tanning. The demand of tanneries operating in Virginia make the production of tannin an important industry.

The chestnut tree grows throughout all the hill and high valley regions of Virginia, but more abundantly in the mountain sections.

ASH

White ash, red ash, Biltmore ash, green ash, black ash and water ash, are the six species composing the ash family in Virginia. White and red, in the order named, constitute a very large proportion of the stand. Biltmore ash is a species recently discovered by botanists connected with the Biltmore forest estate in North Carolina. It is a common tree growing along streams in the mountains and is indigenous only to the southern Appalachian states. Green ash grows in western Virginia, but not in commercial quantities; its most abundant stand is in the lower Mississippi Valley. As with hickory, the manufacturers do not distinguish species of ash lumber for particular uses, nor do lumbermen generally speak of these except by one name, because of

the difficulty of identifying the separate trees. The Virginia sawmills cut 5,500,000 and 3,000,000 went to the manufacturers. The largest quantity consumed was by the handle makers. Ash is probably the most widely distributed of the North American trees. It ranges from the Rocky Mountain States east through every State except Maine.

BLACK OR YELLOW LOCUST

In the rich valleys of Virginia, and on up to the mountainous slopes black locust reaches its best development. Its first and native home is thought to have been limited to the sides and foothills of the Southern Appalachians, but owing to its hardiness and to the ease with which it adapts itself to other soils and climes, it has been planted extensively both in this country and Europe. Locust develops rapidly when young and is growing in favor for planting in farm wood-lots. Locust plantations are growing satisfactorily on the Coastal Plains as well as in the other regions of Virginia. The wood is tough, strong, very durable and unequalled it is claimed for torsional strength and resiliency. It is durable when exposed and very lasting in contact with the ground. In Virginia it is highly valued for shipbuilding, fence posts, insulator pins, and to a less degree than in other States for vehicle stock, principally wagon hubs.

MAPLE

Sugar, red and black maple can be readily identified in the tree, but in the form of lumber all three generally go under the name of sugar maple. In Virginia only a few manufacturers distinguish it in their reports, and only those who require it separately for making commodities for which both species are not used indiscriminately. It is claimed that sugar maple is the most valuable hardwood tree in this country, taking into consideration its production of maple sugar and the fact that next to oak its wood meets the greatest number of uses. Choice figured lumber from this tree brings exceedingly high prices in the market. Sugar maple's and silver maple's range of growth parallel each other, in general extending over much of the same territory east of the 100th meridian. Sugar maple is more abundant in the Northern States, while the silver maple takes precedence usually in the Southern States south of the Ohio River. Virginia wood users use a much larger per cent of the sugar maple. Its stands in the mountains and foothills is scattered, but frequent, while in the lowlands the black and red maples probably outnumber considerably the stand of silver maple. The largest general use of silver maple

is in furniture making for drawer sides and bottoms, mirror backing and table slides.

BEECH

The beech tree is most abundant in the Northern States, where it grows on the slopes and well-drained uplands. In the Gulf States it occurs less abundantly, but it is found on lowlands and borders of streams and swamps. In Virginia its best development is in the mountain region where it is more common than in the lowlands of the Coastal Plains. Beech is held in high favor as turning wood and therefore is in great demand for chair stock and novelties; its most exacting demand is for plane-stocks. Vast quantities of beech wood are used by the wood distillation plants, and in this use it leads in quantity all other woods. In Virginia its chief use is for flooring. Though manufacturers often report the use of both white and red beech, botanically there is but one species. These two names arise from the different color of the heartwood and sapwood, the former being reddish and the latter white. The beech tree is easily identified in the forests by its smooth and light colored bark. Its trunk is symmetrical, of large proportions and the contour of the tree attractive.

SYCAMORE

Virginia saw-mills cut nine times as much sycamore as is purchased by the manufacturers in the State itself; but the quantity of sycamore sent in from other States exceeds the lumber cut more than 50 per cent. Makers of tobacco boxes and packing boxes use almost all that is manufactured in Virginia. When quarter-cut, it makes a handsome appearance in furniture and cabinet work. Sycamore is the easiest distinguished of the American trees; the white and mottled bark is very noticeable, as are the rough balls it bears, which remain hanging on the tree throughout the winter. The sycamore grows in all parts of Virginia from the submerged lands of the Tidewater and swamp regions, high into the Mountain region, where it occurs mostly along streams.

BASSWOOD

Basswood is fairly abundant and is one of the most useful trees of the eastern United States and Canada. In Virginia it appears most abundantly in the mountain region. The Virginia sawmills cut nearly nine times more than the manufacturers of the State require, and yet nearly 50 per cent of the manufacturer's demand was met from wood grown in other States. The wood is light, soft and easily worked, and in many of its uses becomes a competitor of yellow poplar. It

is a favorite veneer wood and northern states meets a demand for making the best grades of excelsior. Manufacturers of paper-pulp and slack barrel heading favor it. The inner bark, called "bast" gives the tree its name. This bast is valuable and largely used for making cords and ropes, and door mats.

BIRCH

There are two species of birch in Virginia. The river (black) birch, sometimes called red birch, grows in the Coastal and Lower Piedmont Regions, on lands subject to overflow and along the banks of streams. Although no manufacturers in Virginia report using it, its properties fit it for many common uses. The furniture manufacturers do not want it because they use birch for outside work and black birch possesses no figure. In Pennsylvania it is extensively used for vehicle hubs and generally it goes into chairs, small handles, and other turned material.

Sweet birch ranges in scattered stands over the mountains of western and southwestern Virginia. Fifty-one State mills report cutting it into lumber but the quantities produced were small. The manufacturers go to other States to buy 75 per cent of their material, which amount to nearly three-quarters of a million feet. The bark of the sweet birch resembles that of black cherry; for this reason the tree is frequently called cherry birch. The sweet aromatic flavor of the bark gives the tree its most common name, sweet birch. The wood serves as a common imitation of mahogany. The lumber in its natural color is beautiful and is used as the decorative wood in cabinet work, interior house finish, and furniture.

SPRUCE

Spruce seeks a cool climate. It is, therefore, one of the most abundant trees of New England and the Northern States. In the Southern Appalachian Region it grows only at comparatively high altitudes. Its range extends to the Georgia line but the farther south it goes the higher the elevation it occupies. Two species grow in the Alleghanies, the red and black spruce. The latter seldom reaches a size large enough for lumber, but this tree in the northeast meets a demand of the wood-pulp manufacturers. Red spruce is the important lumber tree both in the New England and the Appalachian States. In Virginia it appears in the far western section and here the sawmills cut nearly 80,000,000 feet in 1909. The resin of the red and black spruce known as spruce gum is used for confections. The wood is light, soft and elastic. Its most general use in New England is

for rough construction work, but in Virginia ship building consumed a larger quantity than any other industry, the largest part of which came from other States, principally West Virginia.

COTTONWOOD

Ten times more cottonwood is consumed by the manufacturers in Virginia than is cut by the sawmills. The State has a considerable stand of cottonwood, especially in the western part, but it is quite scattered and the wood is not held in high favor by the sawmills. Cottonwood belongs to the poplar family as do the aspens, balm of Gilead, and the black cottonwood of the western Coast. It is commonly known in Virginia as Carolina poplar. Yellow poplar, which properly is called tulip tree, does not belong to this family, the true poplars, but in the uses of the wood they are closely related, especially the cottonwood which often serves as a substitute for yellow poplar. Cottonwood is soft, has little figure, and is easily worked, and these qualities together with its white color makes it suitable for many uses.

HEMLOCK

Hemlock had the fifth largest cut of the woods of the United States and Virgina ranked tenth among the hemlock producing States. Next to yellow pine there was more hemlock lumber sawed in Virginia than any of the softwoods, but less than one-fortieth of it was required by the State's manufacurers. In company with white pine and red spruce, hemlock in Virginia is confined to the slopes and ravines of the mountains. Its best development is at high altitudes and in cool climes. The lake States are the regions of its heaviest stand, although the New England forests at one time contained much hemlock. Not many years ago hemlock had little value as lumber. Wood users referred to it as a forest weed, possessing none of the qualifications of first class lumber. This accounts for millions of feet being cut down only to furnish bark, while the peeled logs were left to rot in the woods. Now, however, the prejudice against hemlock has been practically dissipated, and today it is one of the principal woods for general construction. Many architects specify it in preference to white pine, spruce and second growth yellow pine. The lower grades are held in high favor by the box makers and from the upper grades, siding, flooring, casing, and interior trim are milled.

DOGWOOD

The "flowering" dogwood, so called because of the conspicuous white tracts surrounding its flowers, is the only species in Virginia

supplying wood of commercial value. Its attractive flower distinguishes it in the spring, and in the autumn it can be identified at once by the clusters of shining scarlet berries and the rich purple color of its leaves. It ranges throughout Virginia in scattered stands along banks of streams but most profusely in the western and southwestern part, in vales and mountain ravines. The wood is in great demand because it is heavy, hard, strong, and close-grained, and the supply is insufficient to meet the demand. For special uses, suitable substitutes have been found in persimmon wood and great laurel. Its most exacting demand comes from the manufacturers of shuttles.

ELM

There are four or more species of elm growing in the eastern United States, but only two, in scattered stands, are of commercial importance in Virginia. They are white elm, and slippery elm. The trees are easily distinguished at sight in the forest, for when the leaves of the two are compared the difference is apparent. The easiest identification is by removing a piece of bark. The slippery elm's inner bark as the name suggests, is mucilaginous and fragrant, while that of the white elm is not. Elm is an unimportant lumber tree in Virginia, only thirty-one mills cut it last year and the combined quanitity of them all was almost insignificant. The manufacturers used more than three times as much as the sawmills produced. All of the rock or slippery elm reported was shipped in from other States, while the white elm was entirely home-grown.

WALNUTS

With one exception, the black walnut yields the most valuable cabinet wood of the North American trees. It was once quite plentiful from the eastern foothills of the Appalachians and the Adirondacks to Nebraska and Kansas. It is now very scarce. It is a slow grower but its increasing value has encouraged effort looking to its propagation on a commercial scale. Early in the 17th century the forests of Virginia began to contribute black walnut logs for export to England and since then this wood has been a valuable article of commerce. In 1909, 210 sawmills cut 2 1-3 million feet. The dark brown heartwood which was a rich color and takes an attractive finish, is prized for furniture, fixtures, gun stocks, sewing machines and cabinet work.

Butternut is a species of "walnut" sometimes called white walnut. Its eastern range limit ends in the mountans of western Virginia. The difference in the size and shape of the rough shelled nuts from those

of the black walnut will easily distinguish the tree. The butternut is elongated and smaller than the round black walnut. In the wood, color of the heartweed differentiates the two. The white walnut heartwood is light gray-brown.

CUCUMBER

Virginia and West Virginia together cut a very large per cent of the cucumber timber reported in 1909. This tree frequents the mountain slopes and grows to large and symmetrical proportion and is of handsome appearance. It is a member of the magnolia family and its fruit is somewhat similar in form and appearance to cucumbers. The appearance and physical qualities of the wood so resemble yellow poplar that the uses of the two are nearly identical, and as a rule in commerce no distinction is made. Owing to this it is probable that the manufactures used more cucumber than the table shows and reported it as yellow poplar.

RED CEDAR

Red cedar is a widely distributed tree growing in practically all of the States north of the Gulf State region. In Virginia it is found throughout the State. Large matured trees are most abundant, but scattered, in the western part. Although other juniper woods are used, red cedar meets almost the entire demand for lead pencil material and for this purpose much of it is shipped abroad, the demand for such wood greatly exceeding the supply. Furniture, mothproof chests, and woodenware, are other commodities manufactured from this wood in Virginia. The wood is very desirable and finds its greatest demands for fence posts.

PACIFIC COAST WOODS

Douglas fir is often spoken of in the Eastern States as Oregon spruce or western fir. It is neither a true spruce nor fir, as the tree is more nearly related to the hemlocks. The wood resembles yellow pine and is a competitor of it, especially for rough construction. Its presence, therefore so far from home, in a principal yellow pine State is quite indicative of the future of the wood in the eastern markets. Three-quarters of a million feet of Douglas fir come to the manufacturers of Virginia annually from the Oregon and Washington forests, but according to reports of the wood-using industries of those States, the Oregon and Washington manufacturers do not report using any yellow pine. The cut of yellow pine in the country at large is the only one which exceeds Douglas fir. The yellow pine production, however, is the combined cut of seven species, but the yield of Douglas fir is

from a single species. Douglas fir trees are noted for their great size and from them timbers of exceptional width and length are sawed. Ship builders use the most in Virginia.

Sugar pine resembles white pine and to meet the same uses as the upper grades of white pine it was brought to Virginia from the Pacific Coast Region. The range of this tree is confined almost to one State. It extends but a short distance beyond the northern boundary of California, in Oregon.

The western red cedar is indigenous to our northwest adjacent continental territory and Alaska, and is the third Pacific Coast wood according to quantity shown in this report.

OTHER WOODS

Cherry is very scattered over the western part of Virginia and only 21 sawmills reported cutting small quantities in 1909. The Virginia manufacturers purchased little of the State's cut, as 97 per cent of the cherry used came from Maryland and West Virginia. Next to walnut it is the highest priced domestic wood reported in Virginia.

The yellow or sweet buckeye tree, a native of the mountains, is the species most commonly cut as lumber in Virginia, although the Ohio buckeye is also found growing in this State in comparatively small quantities. These trees while of the same family as the horse chestnut so commonly seen as a shade tree are a different species.

Sassafras is noted as the tree having leaves of many shapes and sizes. It bears clusters of blue berries which ripen in Virginia, in August. In Virginia, North Carolina, Kentucky and Tennessee and further south it reaches proportions of from three to occasionally five feet in diameter. The stand is infrequent and not over one-half million feet was sawed into lumber last year. Sassafras wood is very durable.

FOREIGN WOODS

Some foreign woods are purchased by Virginia manufacturers. Mahogany leads, with nearly one-half million feet. Teakwood comes next in quantity and surpasses in amount that used by Illinois wood users, or by the manufacturers of any of the twelve States for which reports similar to this has been completed. It was imported from Ceylon, India, and Siam. Spanish cedar is not a coniferous tree like the native cedars nor is it related. It has broad leaves and grows in tropical countries. The small quanity of this wood used by the cigar box makers in Virginia was reported as shipped from the West Indies. The highest price was paid for rosewood sent from Central America.

Walnut from the Philippine Islands, white mahogany from the west Coast of Mexico, and silver ava, unidentified as to species and origin, are species which so far have not appeared in any other wood using industry report.

INDUSTRIES

An industry as considered in this report embraces all the factories in the State which make similar or closely related wooden commodities. For example, while 472 manufacturers furnished the information for this report, they have been grouped into twenty-three industries or classes. The same headings which group the Virginia manufacturers have been, and will continue to be, used in preparing similar reports for other States. Where the making of a product for a specific use is a distinct business, though the classification of it would be permissible under a more general heading, a separate division or industry was recognized. For instance, cigar boxes and veneer fruit and vegetable baskets, or packages, can properly be classified under box making; but in Virginia a number of manufacturers specialize in making one or the other commodity and in consequence the data concerning the material used will be presented in separate industry tables. For the same reason the chair factories have been classified separately from the furniture factories.

In collecting the data for this report, the Forest Service assured Virginia manufacturers that in the compilation of the report information on individual concerns would not be revealed. To make this rule effective, where there were less than three manufacturers making the same products, they were not grouped into a separate industry as was the case where more than three reported. Instead of discarding the data in these cases the reports were grouped together and indiscriminately compiled under a general heading, Miscellaneous.

Table 3 sets forth the comparative quantities and value of the wood independent of kind used by the twenty-three industries and gives the amounts and prices of the material grown at home and that shipped in from other lumber producing regions.

TABLE 3.—SUMMARY BY INDUSTRIES OF WOOD USED IN VIRGINIA.

INDUSTRIES	Quantity used annually.					
	Total Feet B. M.	Per cent	Average cost per 1,000 feet f. o. b. factory	Total cost f. o. b. factory	Grown in Va. Per cent	Grown out of Va. Per cent
Boxes	413,371,667	46.22	$11.96	$ 4,944,636.33	60.50	39.50
Planing-mill products	228,337,762	24.97	14.71	3,232,026.75	49.70	50.30
Cars and locomotives	51,293,031	5.73	17.96	921,168.25	16.29	83.71
Sash, doors and general mill work	44,295,940	4.95	24.27	1,075,293.32	55.06	44.94
Paving wood blocks and conduits	27,552,000	3.08	17.56	486,585.00	22.20	77.80
Furniture	20,207,800	2.26	22.15	447,244.90	70.50	29.50
Baskets and fruit and vegetable pkgs.	19,657,330	2.20	13.01	255,713.97	47.95	52.05
Vehicles and vehicle parts	17,487,150	1.96	27.30	477,340.63	71.37	28.63
Trunks	15,364,661	1.72	14.34	220,232.21	90.03	9.97
Ship and boat bldg.	11,138,497	1.25	40.46	449,691.78	10.26	89.74
Woodenware, novelties, matches	10,545,000	1.18	16.93	178,575.00	39.06	60.94
Excelsior	6,032,000	.67	8.48	51,159.50	100.00	.....
Fencing and gates	6,925,000	.77	12.72	75,492.50	91.84	8.16
Insulator pins, etc.	5,875,218	.66	21.06	123,730.36	51.42	48.58
Fixtures	3,068,650	.34	37.30	114,352.75	34.12	65.88
Handles	2,993,000	.33	21.75	65,093.50	96.66	3.34
Agricultural implements.	2,404,000	.27	22.18	53,414.50	89.06	10.94
Caskets and coffins	1,566,346	.18	17.08	26,534.64	82.59	17.41
Poulterers' supplies	647,400	.07	18.34	14,120.00	79.22	20.78
Chairs	770,000	.09	17.44	11,282.75	45.94	54.06
Shuttles	631,400	.07	13.71	8,647.40	100.00	.....
Tobacco boxes	454,550	.05	21.93	9,992.55	66.00	34.00
Patterns	130,800	.01	82.74	10,840.00	16.82	83.18
Miscellaneous	8,692,700	.97	19.36	167,753.40	51.02	48.98
Totals	894,441,902	100.00	$15.00	$13,420,921.99	54.14	45.86

Only two industries, the shuttle block makers and the excelsior factories, procured all their wood from Virginia forests. Seven report using more imported than home-grown lumber. The average cost of material coming from outside in every industry amounted to more than wood purchased from the Virginia sawmills.

The material which went into boxes cost less than that for any other industry except excelsior. The highest average price was paid for lumber used for "patterns" by foundrymen. The ship and boat building material and the lumber going to the makers of store and office fixtures, were the next highest-priced material reported in the order named. The total amount of money paid for raw material by all the industries was more than $15,000,000.

Virginia's importance as a wood-consuming State, compared with the other States so far studied by the Forest Service, is as follows:

State	*Feet B. M.*
Illinois	1,781,536,000
Arkansas	1,361,300,000
Louisiana	1,354,954,000
Michigan	1,282,561,200
Wisconsin	930,382,000
VIRGINIA	894,441,000
Texas	762,336,112
Alabama	726,816,900
North Carolina	676,166,000
Mississippi	618,270,000
Massachusetts	549,320,000
Missouri	443,273,000
New Hampshire	422,904,000
Tennessee	413,878,167
Kentucky	409,634,000
Washington	337,555,000
Oregon	296,792,000
Maryland	284,347,000
Vermont	206,078,000
Connecticut	110,051,000

BOXES

There has been quite an evolution in box making. Not long ago little attention was paid to the character of packages and crates, so long as the wood used was sufficiently strong and cheap. That boxes were made from rough lumber and of material, often unnecessarily thick and heavy, was a matter of little concern. Various widths and several kinds of lumber independent of color often went into the same crate. To-day manufacturers and merchants use care and attempt to show as much character in their packages as they do in other details connected with business. Woods of uniform color and width, of proper thickness, weight and strength, easily nailed, are selected and made into symmetrical attractive looking packages. By the characteristic appearance of their box or crate they purpose that the passer may recognize the brand or make of goods contained in it, without further identification.

There are three clases of box makers. The first class buy rough lumber and manufacture boxes complete ready for use. These are sold

usually to meet the local demand. In Virginia, this demand is extensive, owing to the large and varied manufacturing enterprises and many wholesale jobbing concerns and distributing houses located in the several large cities. This class also make packages of special design which are sold and shipped out of the State already assembled. The lock cornered, wire-bound, dovetailed, re-shippers, and the veneer boxes are examples. The second class are those who purchase shooks in stock sizes and make boxes for local demand by merely assembling and nailing the shooks together without changing the form of the wood by any further process of manufacture. These were not asked for information as they do not come within the scope of this study. Factories manufacturing only box shooks make up the third class. From the standpoint of the quantity of material consumed, the size of the factories, and the capital invested, this class of box makers in Virginia are the most important. They probably produce more shooks than similar manufacturers in other States. The shooks are carefully made so they readily and neatly fit when nailed together, and to facilitate assembling the box they are systematically bundled. The Virginia shook makers most often purchase their raw material in log form, but some of them buy the low grades of lumber from sawmills. This material if not serviceable for boxes would likely be a total loss and consigned to the burner.

Virginia leads all other States so far as studied in the amount of wood used for boxes. Seventeen important lumber consuming States have been studied by the Forest Service, and the following tabulation shows their comparative standing and the three principal woods used for boxes according to quantity.

Virginia	413,371,576 feet	Yellow poplar Yellow pine Red gum
Illinois	372,025,000 "	White pine Red gum Cottonwood
Massachusetts	351,941,350 "	White pine Spruce Hemlock
Michigan	232,111,486 "	White pine Beech Hemlock
New Hampshire	199,075,000 "	White pine Spruce Norway pine
Maryland	136,273,000 "	Yellow pine Cotton gum White pine
Wisconsin	119,267,000 "	White pine Basswood Hemlock

Missouri	111,664,699 feet	Red gum Cottonwood Yellow pine
Kentucky	109,567,000 "	Yellow poplar Red gum Cottonwood
Arkansas	105,552,000 "	Red gum Yellow pine Red oak
Washington	95,036,500 "	Sitka spruce Western hemlock Western yellow pine
Oregon	77,946,000 "	Sitka spruce Western white pine Western hemlock
North Carolina	68,064,000 "	Yellow pine Red gum Tupelo
Louisiana	56,004,500 "	Cottonwood Red gum Birch willow
Vermont	40,249,000 "	White pine Spruce Balsam fir
Mississippi	39,295,093 "	Cottonwood Red gum Yellow pine
Alabama	22,442,000 "	Red gum Longleaf pine Tupelo

Box makers do not demand one kind of wood greatly in excess of others. It will be seen that the predominating species used differs in different regions, usually according to the abundant local stand of suitable woods. All States within reach of the white pine country work up most of their boxes from this wood. The cottonwood in the southern Mississippi Valley, Sitka spruce on the Pacific Coast and red gum in Missouri, Arkansas, Alabama, and Kentucky lead in their respective regions.

In Virginia and North Carolina yellow pine meets the greatest demand. Nearly 87 per cent of the total is of this wood divided among four species, loblolly pine, shortleaf pine, scrub pine and longleaf pine. Except the longleaf shipped in from Georgia and South Carolina, a large portion of the supply of the yellow pines is furnished by second growth timber on old field stands. These trees owing to their rapid growth have a large per cent of sapwood. This timber is light in color, soft and strong and generally a most satisfactory box material. Scrub pine is growing in favor with the box makers on account of its abundance, cheapness, and suitable properties. It is used for only low-grade boxes. In Maryland, Delaware, and New Jersey, like Virginia, more of this timber is worked into boxes than for any other purpose in manufacture.

Red gum timber is plentiful in and near Virginia, and in price is approximately as reasonable as for loblolly and shortleaf pine. The merits of red gum, as material for boxes, has been recognized by the box makers, and in Virginia next to yellow pine they use it more than any other wood. The heart wood is often laid aside and used for packages for exporting goods. Being the principal tree for the rotary veneer cutting machines, red gum furnishes much of the material going into veneer boxes.

When provisions are shipped in containers in contact with the wood they are made from lumber which does not have a tendency to impart a taste or odor. The resinous properties of the yellow pine and the gums do not fit them for this use, but, instead, the yellow poplar, cypress, spruce, and sycamore meet the demand. Chestnut too was called on for this purpose. It was used for meat and cheese boxes. Spruce and yellow poplar in the order named were the principal material for butter boxes, while fresh fish and oysters were packed in boxes made principally from yellow poplar and cypress.

Reshippers are extensively manufactured in Virginia. They are a strong constructed high-grade box crate used for carrying glass bottles, principally soda water, beer, table water and milk bottles. Reshippers have to stand much wear and rough handling and must be made from a strong compact wood. Tupelo has proven most serviceable and was most extensively used. Red gum, cypress, chestnut, and yellow poplar were also worked into reshippers. White pine, sap gum (red gum) and tupelo were reported as the leading woods for interlocking and dovetailed boxes. Strong packages in which projectiles are shipped were made exclusively of longleaf pine.

TABLE 4.—BOXES.

KIND OF WOOD.	Total quantity used annually.				
	Feet B. M.	Average cost per 1,000 ft. f. o. b. factory	Total cost f. o. b. factory	Grown in Va. Feet B. M.	Grown out of Va. Feet B. M.
Loblolly pine	215,743,667	$11.94	$2,574,672.28	132,300,667	83,443,000
Shortleaf pine	96,336,000	12.09	1,165,258.84	40,708,000	55,628,000
Scrub pine	37,549,500	11.27	423,177.23	37,549,500	.....
Red gum	15,786,000	11.65	183,915.00	10,487,000	5,299,000
Yellow poplar	14,431,000	13.26	191,318.18	10,029,000	4,402,000
Cotton gum (Tupelo)	10,550,000	8.33	87,900.00	9,300,000	1,250,000
Longleaf pine	8,924,500	13.08	116,672.00	.....	8,924,500
Chestnut	4,156,000	10.21	42,415.50	3,642,000	514,000
White pine	3,816,000	15.70	59,923.50	2,529,000	1,287,000
Cypress	3,634,000	11.80	42,899.00	2,854,000	780,000
Sycamore	1,510,000	29.81	45,110.00	.....	1,510,000
Black gum	500,000	10.20	5,100.00	250,000	250,000
Spruce	250,000	17.00	4,250.00	250,000	.....
Hemlock	100,000	9.00	900.00	100,000	.....
Red oak	60,000	12.41	745.00	60,000	.....
Basswood (linn)	15,000	14.00	210.00	15,000	.....
Ash	10,000	17.00	170.00	10,000	.....
Totals	413,371,667	$11.96	$4,944,636.33	250,084,167	163,287,500

ILLUSTRATION IV. A RAFT OF LONG LEAF PINE LOGS WAITING TO BE SAWED AND WORKED INTO PLANING MILL PRODUCTS.

PLANING MILL PRODUCTS

A large part of the lumber, before leaving the region where it is cut, is further manufactured into flooring, ceiling, siding, stock moulding, base-boards, roofers, and other matched boards. It is the material consumed for making these planing-mill products in Virginia which the statistics in Table 5 represent. Many large sawmills in this State have planing-mill departments. These and independent planing-mills using bought lumber are the factories which contributed the information of this industry.

Based on the quantity of wood used, this class of manufacturers is the second largest in Virginia. The box makers reported nearly 47 per cent of the total further manufactured as compared with a little over 20 per cent by the planing mills. In North Carolina the adjoining State, the situation is reversed; the planing mills used four times the quantity consumed by the box makers.

Eighteen kinds of wood were required to make the products of this industry. Loblolly pine heads the list as to quantity and cost. This was also the principal planing-mill wood as shown by the Maryland and North Carolina reports. Shortleaf pine is the second wood in Virginia in importance, and, with loblolly, comprises more than four-fifths of the total. Longleaf pine and scrub pine are the other species of yellow pine reported. The former, cut almost entirely in other States, was extensively used by Virginia planing-mills and the price paid for it was the highest of any woods except walnut. The latter grew altogether in Virginia and was next to the cheapest wood.

The kinds of lumber used for flooring were loblolly, longleaf and shortleaf pine, oak, beech, sugar maple, sweet birch, and chestnut. Of the yellow pines, longleaf pine is the superior floor wood, being stronger, harder, and more resinous. It goes into flooring for public buildings where it is subject to excessive wear. It also serves as an ornamental flooring. Waxed and polished, it presents an attractive appearance and is used exposed like hardwood floors. Cheaper grades of flooring are generally made from loblolly and shortleaf pine, although commodities made from the old growths of these wods, especially the edge grained flooring, wear well and meet a wide demand.

Next to yellow pine more oak finds its ultimate form in planing-mill products than any other wood, and flooring is the chief commodity made from it. Its qualities of hardness, strength, and beauty of grain admirably fit it for this use. Oak flooring was quite extensively made from quarter-sawed lumber. Manufacturers in other States use it with birch, maple, black walnut, mahogany, and red gum to form

fancy designs known as parquetry flooring. More oak is used for parquetry floors than any other wood.

In Virginia, as in the northeastern States, beech flooring is growing in popularity. Large quantities of the mountain trees were cut for this use, but most of the supply came from from outside the State, mostly from West Virginia. The large amounts of home-grown birch and maple going into flooring was quite surprising. Chestnut flooring is recommended for porch floors owing to its durability when exposed to the elements.

The properties of absorbing and holding paint better than any other wood makes yellow poplar especially serviceable for siding. Nearly two million feet were converted into this commodity. Based on the quantity used, loblolly pine was the leading wood for siding in Virginia. It is cheaper than yellow poplar, more convenient, and made as most of it is from the sapwood of old-field growths, it readily takes and holds paint. White pine, cypress, hemlock, scrub pine, and small quantities of basswood and buckeye also served in Virginia for siding. Scrub pine lumber has many tight knots. The use of this wood by the planing-mills was mostly for making cheap barn siding.

For interior trim, such as door and window mouldings, baseboards, and quarter-sawed stuff, the variety of figure of the loblolly or Virginia pine makes it preferable to longleaf, besides being easier for the carpenter to fit and nail. Yellow poplar and basswood are the woods worked into these commodities for painted work. Of the hardwoods chestnut, red oak, and white oak lead the moulding woods in quantity. Ash, cypress, walnut, and birch were the other woods serving for interior trim. Like flooring and siding, finish is worked up into stock patterns and bundled ready for the market. It will be noted no red gum in Virginia was so used, although the Missouri and Mississippi reports show that this wood was in large demand for this purpose. In Louisiana, large quantities of tupelo served for making finish. The Pacific Coast States have still different woods for meeting the demands for interior work. Douglas fir, western hemlock (a species different from the eastern hemlock), and western yellow pine were the leaders. These are the cheap softwoods because very abundant, but they possess an attractive grain. Sitka spruce and western red cedar are other conifers answering for this use, while the hardwoods most extensively used are Oregon maple, western birch, and red alder.

Roofers in Virginia were manufactured exclusively from yellow pine. Loblolly, shortleaf, and scrub pine were the species meeting the demand. These sheeting boards are made only from low grades of lumber.

TABLE 5.—PLANING-MILL PRODUCT.

KIND OF WOOD.	Total quantity used annually. Feet B. M.	Average cost per 1,000 ft. f. o. b. factory	Total cost f. o. b. factory	Grown in Va. Feet B. M.	Grown out of Va. Feet B. M.
Loblolly pine	113,656,762	$13.24	$1,767,264.25	76,474,000	57,182,762
Shortleaf pine	62,038,000	13.64	846,310.00	20,118,000	41,920,000
White oak	8,505,000	18.51	157,464.50	4,851,000	3,654,000
Longleaf pine	4,930,000	33.96	167,425.00	40,000	4,890,000
Red oak	4 845,000	18.01	87,245.50	3,234,000	1,611,000
Yellow poplar	1,985,000	21.98	43,633.50	1,485,000	5,000,000
Beech	1,831,000	17.51	32,058.00	824,000	1,007,000
White pine	1,690,000	23.21	39,225.00	1,410,000	280,000
Cypress	397,000	9.27	36,820.00	172,000	225,000
Sugar maple	1,233,000	18.86	23,249.00	508,000	725,000
Scrub pine	1,175,000	10.55	12,400.00	1,175,000	.....
Sweet birch	519,000	19.07	9,897.00	216,000	303,000
Hemlock	204,000	10.20	2,080.00	202,000	2,000
Chestnut	147,000	15.58	2,290.00	147,000	.....
Ash	97,000	27.99	2,715.00	62,000	35,000
Basswood (linn)	40,000	18.12	725.00	40,000	.....
Buckeye	25,000	14.00	350.00	25,000	.....
Walnut	20,000	43.75	875.00	10,000	10,000
Totals	223,337,762	$14.71	$3,232,026.75	110,993,000	112,344,762

CARS AND LOCOMOTIVES

The building and repair of cars in Virgnia is a most important enterprise. The quantity and cost of the lumber required made it the third largest of industries. Besides freight cars of all kinds, passenger and baggage cars, cabooses, and contractors, and mining dump cars, Virginia manufacturers use part of the material listed in Table 6 for constructing locomotive cabs and for other parts of locomotives where wood is essential. Lumber is used by railroads for grade crossings, bridges, depot platforms, trestles, cattle guards, and many other purposes, but this wood was not included in this table nor in this report. It serves for these uses as rough lumber without any necessary change in its form other than trimming and fitting by hand.

Longleaf pine, loblolly, and shortleaf, together furnished more than four-fifths of the total requirements of the car makers. Longleaf, according to amount used, was the most important wood. In many cases its uses for framing were similar to those of oak. It went into sills, body bolsters, and side plates. Besides this, it was used for ridge poles, car lining, belt rails, and body posts, and with loblolly and shortleaf pine, for siding, flooring or decking, roof boards, and linings.

The strength of white oak and red oak makes these woods almost indispensable for car building, white oak being the more favored and used to a greater extent than red. Both of them went in the frame work of passenger and freight cars. The principal uses were for draft timbers, engine beams, tie beams, platforms, truck bolsters, and parts

of the truck. Sidings or side panels of passenger cars were made of yellow poplar, though ash, too, answered for this purpose. Plain and quartered oak and ash were the principal woods for inside finish, yellow poplar, cherry, white pine, and mahogany, walnut and birch were the other woods contributing to the cabinet work.

Ash, poplar, and Douglas fir were the woods used in building the principal parts of locomotive cabs. The floors of the cabs were made of maple, and the bumpers, pilots, and other wood parts of engines were made from oak, principally white oak.

TABLE 6.—CAR AND LOCOMOTIVE CONSTRUCTION.

KIND OF WOOD.	Total quantity used annually.				
	Feet B. M.	Average cost per 1,000 ft. f. o. b. factory	Total cost f. o. b. factory	Va. Grown in Feet B. M.	of Va. Grown out Feet B. M.
Longleaf pine	35,832,521	$16.45	$589,714.25	.....	35,832,521
White oak	5,953,039	19.70	117,148.00	2,805,000	3,148,039
Red oak	4,457,500	17.79	77,675.00	2,374,000	2,083,500
Loblolly pine	2,682,371	16.22	43,453.00	1,880,071	802,300
Shortleaf pine	1,084,000	18.39	19,938.00	980,000	104,000
Yellow poplar	1,026,800	46.45	47,714.00	315,000	711,800
Mahogany	102,500	144.23	14,695.00	.....	102,500
Ash	90,000	56.40	5,075.00	.....	90,000
Cherry	35,000	115.00	4,025.00	.....	35,000
White pine	24,700	63.20	1,529.00	.....	24,700
Sweet birch	4,000	40.00	160.00	.....	4,000
Walnut	600	70.00	42.00	.....	600
Totals	51,293,031	$17.96	$921,168.25	8,354,071	42,938,960

SASH, DOORS, AND GENERAL MILLWORK

Information of material classified under Table 7 was reported by manufacturers making sash, doors, blinds, window and door frames, and general millwork such as is needed for porches, cornices, stairwork, specially designed interior trim, mantels, and grills. The line separating these factories from those described under Table 5, doing only general planing-mill business is clearly drawn as long as these special lines are adhered to. But when considering information furnished by factories which make all or a part of the products grouped under both industries, as in the case of small planing mills which supply local demand, it was difficult to correctly separate the information. In these instances arbitrary action was necessary and was exercised by those who did the field work guided by approximations gained from practical men.

More than 55 per cent of all the wood used by the factories grouped under this industry was grown in Virginia. Loblolly pine furnished the largest portion of the home-grown wood, and was first in quantity

of the 27 different species demanded. More white pine, cucumber, and buckeye was reported by this industry than any other, and the second largest amount of all the cypress, sweet birch and basswood, used in the State went to these factories. It is logical that sash and doors should be extensively manufactured in Virginia as suitable woods for making them grow plentifully in this and adjacent States. For doors, loblolly and shortleaf pine, longleaf pine, cypress, red oak, and white oak, chestnut, white pine and mahogany were most largely demanded. The North Carolina door as it is called by the trade is made from loblolly and shortleaf pine cut in Virginia and North Carolina. It forms commercially one of the most important articles of commerce produced by Virginia factories. These doors find a market in many States besides supplying a large foreign demand. The principal sash woods, both for stock sash and for specially designed work, such as store fronts, were white and loblolly pine. Much of the white pine was State grown and only a small part of the imported wood came from the white pine regions of the Lake States. Other species, including hardwoods, also served for making sash, and among them sugar pine grown in California. Sugar pine resembles white pine and has many uses in common with it.

Outside finish was extensively worked from loblolly and shortleaf pine because most convenient. These pines, especially the second growth, have less resin and are therefore better for holding paint. Yellow poplar, cypress, white pine, cucumber, and basswood were also contributors in this line and possibly are the best qualified of all eastern woods for exterior work. Douglas fir, the second Pacific Coast wood appearing in this industry, also served for outside work, but was reported in only small quantities. Its suitability for this purpose is shown by the quantity of it going into exterior building construction in the western and central States.

The hardwoods met a large demand for interior trim, such as mouldings, wainscoting, stairways, mantels, and colonnades. As would naturally be supposed, the Virginia oaks contributed the largest part of the material, with chestnut second. Sweet birch was the third important hardwood and all but a very limited quantity came from the Lake States. The other cabinet woods were red gum, sugar maple, mahogany, sycamore, ash, walnut, and cherry. For painted work inside, yellow poplar was probably most generally used, though buckeye in the western part of the State served with it. Loblolly pine and cypress constituted the largest supply of the softwoods for interior trim. The prominent attractive grain of these woods allows them to be used, varnished and finished in the natural. The largest part of

the supply of the cypress was imported from South Carolina and Florida.

TABLE 7.—SASH, DOORS, BLINDS, AND GENERAL MILL WORK.

KIND OF WOOD.	Total quantity used annually. Feet B. M.	Average cost per 1,000 ft. f. o. b. factory	Total cost f. o. b. factory	Grown in Va. Feet B. M.	Grown out of Va. Feet B. M.
Loblolly pine	14,308,500	$20.99	$ 298,617.00	11,455,000	2,853,500
White pine	6,859,440	25.43	174,452.42	2,711,465	4,147,975
Longleaf pine	5,435,000	26.04	141,532.50	50,000	5,385,000
Shortleaf pine	5,015,000	21.59	108,268.00	2,863,000	2,152,000
Yellow poplar	4,067,500	26.17	106,475.00	2,803,500	1,264,000
Cypress	2,525,000	38.40	96,062.40	115,000	2,410,000
Red oak	1,312,000	23.83	31,250.00	1,111,000	201,000
White oak	1,208,000	31.87	38,716.00	740,000	468,000
Scrub pine	995,000	12.64	12,580.00	995,000	.....
Chestnut	869,000	20.28	17,619.00	711,000	158,000
Basswood (linn)	320 000	17.89	5,725.00	220,000	100,000
Sweet birch	271 000	45.69	12,383.00	14,000	257,000
Maple	179 000	31.90	5,710.00	42,000	137,000
Ash	155,000	26.48	4,005.00	105,000	50,000
Cucumber	150,000	18.00	2,700.00	75,000	75,000
Red gum	130,000	13.69	1,780.00	60,000	70,000
Hemlock	130,000	17.35	2,255.00	130,000	.....
Beech	115,000	25.54	2,937.50	65,000	50,000
Sugar pine	68,000	68.53	4,660.00	.....	68,000
Buckeye	55,000	12.73	700.00	55,000	.....
Mahogany	22,500	167.20	3,690.00	.....	22,500
Sycamore	27,000	19.35	522.50	27,000	.....
Cotton gum (Tupelo)	25,000	17.50	437.50	25,000	.....
Douglas fir	25,000	48.50	1,212.50	.....	25,000
Walnut	10,500	54.00	540.00	7,500	3,000
Hickory	9,500	23.68	225.00	9,500	.....
Cherry	5,000	18.00	90.00	.....	5,000
Red cedar	4,000	37.00	148.00	.....	4,000
Totals	$44,295,940	$24.27	$1,075,293.32	24,389,965	19,905,975

WOOD-PAVING BLOCKS AND CONDUITS

The articles belonging to this industry are used for municipal improvements. Conduits are used in underground construction for the distribution of electric power and telephone service. The terra cotta conduits have until within recent years met the entire demand as wood ducts were not practical owing to their being subject to decay when in contact with the ground. The development of successful methods for the prevention of decay by impregnation of the wood with creosote and other antiseptic solutions has increased the life of woods as much as double its natural life. This has led to the adoption of wood conduits. The demand for them is growing, and owing to their being more moderate in price, lighter in weight, more economical to lay, and less liable to break, they have entered into active competition with the clay conduit. The underground telegraph line recently completed from Boston to Washington, D. C., at a cost of three and one-quarter million dollars is laid in wood ducts the entire distance.

These ducts are usually 4½ inches square, random lengths, and have a 3 inch hole bored through. Large conduits with three and four openings are also made and used for underground municipal distribution. Loblolly pine and shortleaf pine were the woods reported for making conduits. These woods being soft and porous are especially desirable for their easy impregnation with creosote.

Wood blocks for paving city streets are gaining in favor. In 1910 the Census figures show that 770 miles of street in this country were wood paved. This is an increase in two years of more than 15 per cent. Prevention of decay by creosoting has also been the chief factor in stimulating the demand for wood pavement. Longleaf yellow pine shipped in from Georgia, Florida, and Alabama was the principal species reported, and until lately has been considered the most practical wood for successfully meeting this use. Water or black gum (*Nyssa bifora*) is the other paving wood mentioned. The table shows that over a million feet was used last year. Being a cheap hardwood of compact structure with adaptability for absorbing preservatives, water gum blocks are destined to grow in popularity. Creosoted railroad ties made from this wood were used in the new tunnel recently built by the Pennsylvania Railroad Company under the Hudson River in preference to ties made from other more expensive woods.

The manufacture of creosoted paving blocks and conduits is a most important industry in Virginia. In quantity of wood consumed it stood third in the list of the industries and its products were widely distributed over many States. The conduits for the underground line from Boston to New York to Washington, D. C., mentioned above, were made by Virginia factories.

TABLE 8.—PAVING WOOD BLOCKS AND CONDUITS.

KIND OF WOOD	Total quantity used annually. Feet B. M.	Average cost per 1,000 ft. f. o. b. factory	Total cost f. o. b. factory	Grown in Va. Feet B. M.	Grown out of Va. Feet B. M.
Longleaf pine	11,700,000	$21.18	$ 247,700.00	.....	11,700,000
Shortleaf pine	11,302,000	14.82	166,960.00	3,767,000	7,535,000
Loblolly pine	3,500,000	15.00	52,500.00	2,000,000	1,500,000
Black gum	1,050,000	18.50	19,425.00	350,000	700,000
Totals	27,552,000	$17.66	$ 486,585.00	6,117,000	21,435,000

FURNITURE

Table 9 shows the kinds of woods consumed for furniture in 1911, their quantities and prices. According to the total amount of these woods, this industry holds sixth place among the industries

treated in this report. These statistics include products of factories making all kinds of furniture except chairs and to a limited extent those making furniture parts, as built-up dresser, chiffonier, and table tops, panels, bed slats, and drawer sides.

A number of Virginia manufacturers make only a distinct line of goods like kitchen safes, tables, wardrobes, or couches and lounges. This tendency to specialization in furniture making is becoming more widespread, it makes for economy and benefits both consumer and manufacturer. However, the number of concerns making single lines of goods in Virginia was not large enough to permit the grouping of them into separate and distinct industries.

The following tabulation shows the quantities of the principal woods used by the manufacturers of furniture in each of sixteen States studied by the Forest Service:

	Oak M ft.	Maple M ft.	Birch M ft.	R. gum M ft.	Yellow Poplar M ft.	D. fir M ft.	Chestnut M ft
North Carolina	134,500	.....	.....	.....	14,500	.....	4,500
Illinois	58,490	16,886	16,444	.....	22,500		
Michigan	30,883	9,095					
Wisconsin	21,720	26,532					
Massachusetts	16,722	8,563					
Virginia	13,878	.....	.....	.....	2,729		
Kentucky	13,358	.....	.....	4,181	.....		
Maryland	11,644	1,441					
Missouri	8,146	.....	.....	12,740			
Arkansas	5,586	.....	.....	9,061			
New Hampshire	1,300	.....	.....	.....	.....	.....	600
Louisiana	1,040	.....	.....	3,415			
Oregon	.....	2,414	.....	.....	.....	4,862	
Washington	2,869	1,072					
Connecticut	.....	687	525				
Alabama	340						

Merely a glance at the above figures shows that oak is preeminently the furniture wood in this country. Even in States where its stands are not plentiful it leads all other woods. Massachusetts, Illinois, Maryland, and Wisconsin, are examples. In Missouri, Arkansas, and Louisiana where red gum takes the lead, it stands second in quantity used. Maple, birch, red gum, and yellow poplar, are the other woods, probably in the order named, which, after oak, are called on in the greatest quantities by the furniture makers.

Trees producing furniture lumber are plentiful in Virginia and the sawmills of this State not only have more than they need for home consumption but send away a large part of their cut to factories in other States. In the case of oak for example, the sawmills produced

Illustration V. Inside View of a Virginia Table Factory.

nearly 388 million feet but the wood using industries consumed less than 10 per cent, and the furniture makers less than one per cent. Compared with other States not only do the many kinds of hardwood stands favor the Virginia manufacturers, but also the prices of lumber. White oak cost the Massachusetts furniture makers an average of $34.59; the Maryland report gives $31.86; the Illinois report $45.59; the Wisconsin report $34.44.

The advancement made in gluing woods has brought about a considerable change in the methods of furniture making Formerly, nearly all parts of chiffoniers, tables, wardrobes, bureaus, sideboards, etc., were made from solid lumber. Today these parts, by the use of the glue pot, are frequently made from built-up lumber. Furniture tops, for instance, are strips of various woods suitable for coring, glued and jointed together and upon them is stuck an overlay of attractively figured veneer. Door and drawer fronts are similarly made. The sides are three-ply panels and the backs frequently two-layer stock.

In three-ply lumber the inside layer is usually a wood which takes stain well and can be made to imitate the color of the outside wood. Birch, red gum, maple, yellow poplar, are largely used. The outside sheet is mahogany, oak, walnut, sycamore, tupelo, birch, ash, red gum, sassafras or cherry. The middle sheet, the thickest, transverse to the grains of the other two, is a soft porous wood, such as yellow poplar, white pine, cottonwood, basswood, cucumber, or loblolly pine, selected for its quality to absorb and hold strongly to glue. Furniture backs are usually made of a number of thin narrow boards neatly nailed to the frame, and over them is stuck a thin sheet of yellow poplar, cottongum, or cottonwood, which gives the appearance of a solid back. This two-ply work is in high favor with manufacturers making moderate-priced and high grades of furniture and is taking the place of the old method of paneling the backs.

White oak and red oak, chestnut, loblolly and shortleaf pine and cypress were the woods used for furniture frames. Sugar maple and ash supplied the drawer sides and the extension table slides because these woods have the quality of wearing smooth. Chestnut, yellow poplar, and loblolly pine were the principal core woods. White and red oak, ash, maple, birch, red gum, and cherry were the principal exterior woods. White pine, yellow poplar, basswood, cotton gum, and red gum met the demand for drawer bottoms, partitions, shelving and other inside work.

Kitchen safes and cabinets were made from yellow poplar, tupelo, and the low grades of oak. Ditty boxes used on board of battleships as a place for sailors to keep their personal effects were made exclu-

sively from ash. More than 20 million feet of all kinds of wood went into furniture in Virginia in 1911 and over 70 percent of it was from State-grown material.

TABLE 9.—FURNITURE.

KIND OF WOOD	Total quantity used annually. Feet B. M.	Average cost per 1,000 ft. f. o. b. factory	Total cost f. o. b. factory	Grown in Va. Feet B. M.	Grown out of Va. Feet B. M.
Red oak	6,313,500	$22.56	$142,430.00	4,234,000	2,079,000
White oak	5,884,600	21.34	125,504.90	4,595,500	1,289,100
Yellow poplar	2,729,100	18.01	49,044.50	2,331,533	297,567
Black oak	1,065,000	19.18	20,430.00	1,065,000	.....
Red gum	830,000	23.15	19,175.00	.....	830,000
Chestnut	745,000	17.47	13,015.00	610,000	135,000
Loblolly pine	603,000	15.49	9,338.00	528,000	75,000
Sugar maple	578,000	21.50	12,419.00	553,000	25,000
Cotton gum (Tupelo)	520,000	15.00	7,800.00	.....	520,000
White pine	239,000	58.57	14,070.00	20,000	219,000
Shortleaf pine	234,000	11.18	2,617.00	234,000	.....
Ash	107,000	56.13	6,026.00	.....	107,000
Mahogany	96,800	157.21	15,318.00	.....	96,800
Basswood (linn)	84,700	28.20	2,389.00	15,000	69,700
Sweet birch	75,000	56.30	4,221.00	.....	75,000
Cypress	30,000	35.00	1,050.00	.....	30,000
Sycamore	25,000	22.50	562.50	25,000	.....
Red cedar	22,000	24.09	530.00	22,000	.....
Cherry	13,000	67.00	871.00	.....	13,000
Sassafras	12,000	32.00	384.00	12,000	.....
Walnut	1,000	50.00	50.00	1,000	.....
Jarra	100	200.00	20.00	.....	100
Totals	20,207,800	$22.13	$447,244.90	14,246,033	5,961,767

BASKETS, FRUIT, AND VEGETABLE PACKAGES

In a number of the States for which wood-using industry reports have been written, information of woods used for making baskets, fruit and vegetable packages was included in the industry for box making. In Virginia as in North Carolina and Ketucky the factories making these commodities are distinct from the box manufacturers. The number of them justifies their grouping into a separate class. They comprise an important industry and according to the quantity of wood used they are one of the seven principal groups of manufacturers operating in the State.

The products of this industry are made almost exclusively of veneer. The tops and bottoms of baskets and veneer barrels have to be thicker material and are made from thin lumber which is often sawed from cores, that part of the log left after the veneer has been removed, wood waste or made from low grades. The principal woods reported for making veneeer packages were red gum, tupelo, and black gum. These trees abound in the southeastern and southern part of the State in North Carolina near Virginia's southern line.

Their stumpage value is lower than any other Virginia timber and the cost of cutting them into veneer by a rotary process is the most economical and entails less waste, it is claimed, than the manufacture of logs in any other form. The products of this industry, therefore, can be sold at a very moderate cost, and accounts for the rapidly growing custom of marketing provisions in individual packages.

A large amount of the wood consumed in this industry is for making veneer barrels. In Virginia, they are used principally for trunk and oyster barrels, though the manufacturers made them to sell out of the State where they are used as lime barrels and for packing and shipping queensware, glassware, and other fragile goods. The Bureau of the Census mentions in their discussion of the statistics of slack cooperage production for 1910, that the noted decline in the quantity of staves and heading manufactured was probably largely due to the competition of the veneer barrel, which, being cheaper, has taken the place of the slack barrel for many uses. Other commodities made by this industry include baskets of all kinds, crates, cups, tills, hoppers, and venders' trays.

Red gum was the principal wood reported. More of it was used than the combined amounts of the other six species. Black gum, next in importance in the table, was composed both of the water gum and the upland black gum. Owing to the confusion in the local names of gum and the difficulty in distinguishing them from tupelo, the figures shown in the table for black gum may include a portion of tupelo. The quantities of tupelo reported were one-third less than black gum. Soft elm was used for hoops on veneer barrels and small quantities of chestnut cut thin were called on to serve as bottoms of cabbage crates.

TABLE 10.—BASKETS AND FRUIT AND VEGETABLE PACKAGES.

	Total quantity used annually.				
KIND OF WOOD	Feet B. M.	Average cost per 1,000 ft. f. o. b. factory	Total cost f. o. b. factory	Grown in Va. Feet B. M.	Grown out of Va. Feet B. M.
Red gum	13,812,000	$13.97	$192,756.00	6,397,667	7,414,333
Black gum	3,490,000	11.13	38,848.00	1,507,336	1,982,664
Cotton gum (Tupelo)	1,380,000	10.44	14,400.00	546,000	834,000
Loblolly pine	650,330	9.12	5,924.97	650,330	.....
Yellow poplar	180,000	14.00	2,520.00	180,000	.....
White elm	140,000	10.14	1,420.00	140,000	.....
Chestnut	5,000	9.00	45.00	5,000	.....
Totals	19,657,330	$13.01	$255,713.97	9,426,333	10,230,597

VEHICLE AND VEHICLE PARTS

Table 11 relates to the manufacturing of vehicles and vehicle parts. It does not include all material going into wagons in Virginia, as wheelwrights in nearly every city, town, and postoffice throughout the State build a few handmade vehicles each year and to locate and gather information from all was found impracticable. Factories rarely make all of the component parts from rough lumber and turn out the vehicle complete. Some buy spokes, rims, and hubs separately, but manufacture all the rest of the vehicle. Others purchase wheels complete, axles skeined and gear parts ironed and assembled, poles and shafts ready for use, and make only bodies. Another class procure all parts complete even the bodies and the tops and merely assemble them.

In no other industry is specialization in manufacturing better illustrated than in the making of vehicles. This can be accounted for in part by the fact that vehicle parts are made from the choicest grades of wood and the timber most suitable for each part is often found in widely separated localities. For instance the pole and shaft makers find the supplies of hickory best suited for their needs in Kentucky, Missouri, and Arkansas. The hub makers use the largest quantity of soft elm and cork elm in the northern States and Canada, while the spoke manufacturer and the rim manufacturer are widely distributed and operate extensively in Virginia, West Virginia, Kentucky, Tennessee, and Missouri. Further, in the making of vehicle parts, there is a great amount of waste, and to have the factories making distinct parts located near to the source of the timber supply makes for economy and lower prices as well as for greater efficiency in manufacturing.

Care was exercised not to get information concerning the same material twice. If a manufacturer bought parts of the vehicle ready made he was asked to give data only of those parts which he actually manufactured from rough lumber. If he operated merely to assemble the vehicle and had only to paint and put on finishing touches, a report was not requested, but if he was a manufacturer of vehicle parts, special effort was made to secure the information of the material used.

The kinds of vehicles manufactured in Virginia are buggies, carriages, and other light personal conveyances, besides wagons for city and country use, trucks, drays, carts, log wagons, tobacco warehouse trucks and wheelbarrows.

This industry is of much importance in Virginia. It consumes over seventeen million feet of wood annually and paid close to a half

million dollars for it. Similar industries in Kentucky, Illinois, Missouri, and Wisconsin show the use of greater quantities of vehicle wood than the Virginia manufacturers report, but of eight of the eastern States so far studied, Virginia vehicle makers lead, followed by North Carolina. In all the States for which reports similar to this have been prepared, even in the Pacific Coast States, where no hickory grows, hickory and white oak in quantity are the principal woods used by the vehicle industries. They constitute over 76 per cent of the total.

The hickory went into shafts, tongues, spokes, rims, axles, bolsters, other gear parts and whiffle-trees, and the white oak into frames for bodies, spokes, hounds, rims, tongues, bolsters, spring bars and hubs. Red oak's uses were similar to white oak's even to the extent of being turned into hubs and bent into rims. Ash found its most important service for tobacco trucks but served besides as body frames, spring bars, tongues and ladders. Osage orange, called "bodoc" was used for hounds. It appears in no other industry of this report.

The body woods were loblolly pine, longleaf pine, yellow poplar, ash, red gum, cottonwood, white pine, and cottongum, basswood, and sugar maple. Longleaf pine, sugar maple and the oaks went for the floorings or bottoms of bodies; the panels were made of yellow poplar, red (sap) gum, ash, white pine and basswood, and the linings were of loblolly pine, longleaf pine, red gum, tupelo, cypress and cottonwood; ash, hickory, tupelo and poplar were reported for tops.

TABLE II.—VEHICLES AND VEHICLE PARTS.

	Total quantity used annually.				
KIND OF WOOD	Feet B. M.	Average cost per 1,000 ft. f. o. b. factory	Total cost f. o. b. factory	Grown in Va. Feet B. M.	Grown out of Va. Feet B. M.
White oak	6,904,200	$25.80	$178,395.50	5,874,700	1,029,500
Hickory	6,530,850	31.53	205,879.13	4,122,850	2,408,000
Loblolly pine	1,089,250	14.04	15,284.35	720,250	369,000
Red oak	878,000	22.34	19,610.50	771,000	107,000
Yellow poplar	669,500	31.32	20,884.00	368,000	301,500
Ash	577,750	29.70	17,226.75	308,500	269,250
Longleaf pine	253,500	21.15	5,358.50	.....	253,500
Shortleaf pine	247,000	12.74	3,148.00	247,000	.....
Red gum	212 000	12.74	3,148.00	247,000	.....
Cottonwood	50,000	20.00	1,000.00	50,000	.....
White pine	47,500	62.12	2,949.00	17,000	30,500
Osage orange	13,000	48.00	624.00	.....	13,000
Basswood (linn)	7,500	40.13	301.00	.....	7,500
Cotton gum (Tupelo)	4,000	25.50	102.00	.....	4,000
Sugar maple	2,400	41.80	100.50	.....	2,400
Cypress	700	42.00	29.40	700	.....
Totals	17,487,150	$27.30	$477,340.63	12,480,000	5,007,150

TRUNKS

In the quantity of material entering into the manufacture of trunks, Virginia holds a most important rank among all the States. Seventeen States so far have been studied for wood consumption and among these the Virginia trunk makers stand first.

A number of manufacturers do all the work from the arrival of the rough lumber to the covering, lining and varnishing of the completed trunk, but others make only the trunk boxes, and others trunk slats and ship their products to manufacturers in other States who put on only the finishing touches. Loblolly and shortleaf pine being a soft light wood and easily worked accounts for their being the principal woods used in Virginia for trunk boxes. Yellow poplar also extensively meets this use and is the favorite wood for trays and compartments. These three woods compose 80 per cent of the total amount shown in the table.

Boxes made of panels built up of three-ply veneer are rapidly gaining favor with the trunk makers. Sheets of red gum with a filling or a middle transverse sheet of yellow poplar or cottonwood are the veneers used for panels. Soft elm met the greatest part of the demand for trunk slats, though cypress and hickory also served in this capacity. Eighty per cent of the wood used by this industry was home-grown.

The Wisconsin, Illinois, and Michigan trunk makers use basswood and white pine principally for trunk boxes. Much of the basswood used is three-ply veneer. Slats are of white and cork elm, ash, and hickory. In Kentucky and Missouri, yellow pine, cypress, hickory, cottonwood, and red gum are extensively used for boxes and white ash, elm, ash, and silver maple for slats.

TABLE 32.—TRUNKS.

[illegible]

Kind of wood	Per B. M.	Average [illegible]	Total cost [illegible]	Grown in Va. Feet B. M.	Grown out of Va. Feet B. M.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.....
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.....
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.....
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	.....	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.....
Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

TRUNKS

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TABLE 12.—TRUNKS.

KIND OF WOOD	Total quantity used annually.				
	Feet B. M.	Average cost per 1,000 ft. f. o. b. factory	Total cost f. o. b. factory	Grown in Va. Feet B. M.	Grown out of Va. Feet B. M.
Loblolly pine	10,324,990	$15.34	$126,799.88	10,324,990	.....
Shortleaf pine	2,151,000	15.45	32,989.97	2,151,000	.....
Yellow poplar	1,215,000	18.00	21,225.00	1,215,000	.....
Cottonwood	700,000	22.85	16,000.00	.....	700,000
Red gum	576,090	12.50	11,063.08	136,090	440,000
White elm (soft)	292,581	32.11	9,704.28	.....	292,581
Cypress	100,000	21.00	2,100.00	.....	100,000
Hickory	5,000	70.00	350.00	5,000	.....
Totals	15,364,661	$14.34	$220,232.21	13,832,080	1,532,581

ILLLUSTRATION VI. A MUD SCOW READY TO LAUNCH ON WAYS OF NORFOLK SHIP YARD.

SHIP AND BOAT BUILDING

A number of deep navigable rivers and their branches, Chesapeake Bay, Hampton Roads, and the Atlantic Ocean, give Virginia many miles of water front. Large areas of the State, rich agriculturally and well populated, depend entirely upon boat service for their principal means of transportation and commerce with different parts of Virginia and with markets in other States. Virginia has a number of deep harbors. Norfolk and Newport News especially afford natural advantages and depths, which put them in line with the foremost ports on the Atlantic Coast. The largest ocean vessels and men-of-war land at their docks. It is not surprising, therefore, with such facilities that Virginia is an important ship-building State and that this industry is one of the principal ones. Boats of all kinds, from the battleship and the finest oceanic liners, down to the launch and row boat, are made by Virginia builders. In building the large seafaring vessels steel construction has to such a large extent taken the place of wood that lumber is now only incidental, when less than a century ago it was the most essential and in value the most important of the materials used. Wood is still largely employed in construction of smaller boats, for instance, for building the superstructures of river and inland-water boats and tugs, also for scows, barges, launches, sail boats, row boats, and canoes.

Many kinds of lumber are demanded by boat builders as the large number of uses they serve often require woods of special qualities. Table 13 shows 19 species were reported. For the keelsons, long lengths are necessary combined with strength and elasticity. Longleaf pine has long served this use but in recent years Douglas fir has been growing in favor. The Oregon timber is purchased more extensively by the boat builders than by any other Virginia wood-using industry. Besides keelsons, Douglas fir is used for spars and decking. White oak, and red oak, on account of their strength, went into keels, keel blocks, rails, strakes, guards, and head logs.

Longleaf yellow pine, in quantity the leading wood bought by the boat builders, meets the demand for many uses. The principal ones are for spars, decking, deck beams, keelsons, head logs, bulk heads, and general ship work.

Cypress is not as important a species for ship building as may be supposed. It answers for ceiling, decking and inside finish, but is not indispensable. Other woods, red oak, Douglas fir, spruce, shotrleaf pine, white pine, and longleaf pine are reported for the same uses. These woods and ash also were employed in many other parts of the

superstructure. West Virginia spruce was called on for spars, water, or black gum occasionally for keels, cottonwood and shortleaf pine for templets, and white cedar or juniper for siding of small pleasure boats. Hickory's only demand was for handles, and locust went into spokes and trunnels.

White and red oak, quartered and plain, ash, cherry, mahogany, yellow poplar, red gum, and teakwood are the cabinet woods used for the boat's interior finish. Teakwood served for parts of the pilot house and for armor backing. It was shipped from India. The boat builders consume the largest quantity of mahogany of any of the industries in Virginia. It was imported from the west Coast of Africa and from Mexico.

TABLE 13.—SHIP AND BOAT BUILDING.

KIND OF WOOD	Total quantity used annually. Feet B. M.	Average cost per 1,000 ft. f. o. b. factory	Total cost f. o. b. factory	Grown in Va. Feet B. M.	Grown out of Va. Feet B. M.
Longleaf pine	6,011,685	$34.04	$204,630.98	.....	6,011,685
Shortleaf pine	1,176,165	24.10	28,327.30	536,165	640,000
White oak	874,689	34.34	30,016.21	491,837	382,852
White pine	805,489	80.05	64,439.12	.....	805,489
Spruce	672,025	26.00	17,472.65	.....	672,025
Douglas fir	584,736	58.60	34,215.37	.....	584,736
Cypress	432,818	52.25	22,574.54	.....	432,818
Mahogany	145,558	130.50	18,922.54	.....	145,558
Red oak	132,000	31.90	4,210.00	102,000	30,000
Ash	102,653	60.00	6,159.18	.....	102,653
Southern white cedar	98,113	51.71	5,068.15	.....	98,113
Teakwood	42,059	200.00	8,411.80	.....	42,059
Cherry	39,926	110.00	4,391.86	.....	39,926
Red gum	5,000	25.00	125.00	5,000	.....
Black gum	4,190	25.00	104.75	4,190	.....
Cottonwood	4,026	40.00	161.04	.....	4,026
Hickory	3,195	47.00	150.17	3,195	.....
Yellow poplar	2,647	60.00	158.82	.....	2,647
Butternut	1,523	100.00	152.30	.....	1,523
Totals	11,138,497	$40.46	$449,691.78	1,142,387	9,996,110

WOODENWARE, NOVELTIES, AND MATCHES

Pails, freezers, buckets, step ladders, lard trays, butter dishes, calendar strips, and matches are the commodities covered by Table 14.

White cedar, juniper, and the light wood of cypress met the principal demand for pails and ice-cream freezers. A large number of the pails were intended for candy packing and these woods were selected in preference to any because the source of supply is near at hand and they have the necessary quality of imparting no taste to the goods contained within them. More white cedar goes into pails than into any other products made by Virginia factories. Horse buckets and well

buckets were made from white oak with bottoms of ash, while the veneer cut from tupelo and black gum served as the material from which butter trays, lard dishes, and wooden plates were made. More than two-thirds of all the basswood used in the State went to factories listed under this industry and was made into calendar strips. Of all the American woods, white pine meets the largest demand for matches. It is significant therefore, that the match manufacturers in Virginia use no white pine but instead consume large quantities of basswood and the white wood of yellow poplar.

TABLE 14.—WOODENWARE AND MATCHES.

KIND OF WOOD	Total quantity used annually.				
	Feet B. M.	Average cost per 1,000 ft. f. o. b. factory	Total cost f. o. b. factory	Grown in Va. Feet B. M.	Grown out of Va. Feet B. M.
White cedar	3,400,000	$16.68	$56,700.00	1,100,000	2,300,000
Cotton gum (Tupelo)	2,400,000	14.00	33,600.00	900,000	1,500,000
White oak	1,750,000	20.57	36,000.00	750,000	1,000,000
Basswood (linn)	1,075,000	19.04	19,875.00	475,000	600,000
Cypress	550,000	18.00	9,900.00	.....	550,000
Yellow poplar	500,000	18.00	9,000.00	250,000	250,000
Black gum	400,000	15.00	6,000.00	234,000	166,000
Ash	350,000	18.00	6,300.00	350,000	.....
Loblolly pine	120,000	10.00	1,200.00	60,000	60,000
Totals	10,545,000	$16.93	$178,575.00	4,119,000	6,426,000

EXCELSIOR

Excelsior makers in Virginia used only two species of wood and they both belong to the same family, they were scrub pine and loblolly pine. Except for boxes, this was the principal use accorded to scrub pine and ten per cent of the total used for manufacture in the State went into this commodity. The raw material was purchased in the form of bolts and reported in terms of cords. To make this table comparable with the others, and to enable the statistician to include it and the items of it in the summary tables, the cords were reduced to board feet measure and the prices changed to correspond. The price paid for wood demanded by the excelsior makers was the lowest average cost of any of the material delivered to any other of the industries.

The manufacture of excelsior in Virginia is confined to the section in the northeastern part of the State. Here the stands of scrub pine and young second growth loblolly are quite abundant. It may be that some old-field shortleaf pine is included in these figures reported for scrub pine, as in this section of the State the three species are found growing associated, but the shortleaf appears only in scattered stands.

In the Lake States and the New England States, aspen, or popple,

and basswood are the woods used for excelsior. The best grades of excelsior, chiefly for upholstering are made from them. In Missouri and Kentucky, cottonwood, buckeye, willow, and cottongum were the principal woods serving for this purpose. The North Carolina excelsior cutters preferred white pine and yellow poplar, but used large quantities of loblolly pine. In the Pacific Coast States black cottonwood, western red cedar, and Sitka spruce were the favorite excelsior woods.

TABLE 15.—EXCELSIOR.

KIND OF WOOD	Total quantity used annually. Feet B. M.	Average cost per 1,000 ft. f. o. b. factory	Total cost f. o. b. factory	Grown in Va. Feet B. M.	Grown out of Va. Feet B. M.
Scrub pine	4,524,000	$ 8.48	$38,369.63	4,524,000	.....
Loblolly pine	1,508,000	8.48	12,789.87	1,508,000	.....
Totals	6,032,000	$ 8.48	$51,159.50	6,032,000	.....

FENCING AND GATES

Table 16 lists the woods used in Virginia for making fence pickets and for constructing wire reels. The loblolly pine and the shortleaf pine contributed all of the reel material and over six and a quarter million feet of Virginia forests is required annually to meet the demand. The durable properties of cypress when exposed, together with its strength, favors it preeminently as the principal wood for pickets. Many times more of it was used for this purpose than all the other woods combined. The other picket woods reported were white oak, red oak, and chestnut. The wood parts of patent fencing made of woven wire and small pieces of wood called stubs were reported made from cypress and chestnut. The latter being cheaper and fairly lasting is growing in favor with the patent fence makers.

TABLE 16.—FENCING AND GATES.

KIND OF WOOD	Total quantity used annually. Feet B. M.	Average cost per 1,000 ft. f. o. b. factory	Total cost f. o. b. factory	Grown in Va. Feet B. M.	Grown out of Va. Feet B. M.
Loblolly pine	5,020,000	$10.44	$52,420.00	5,020,000	.....
Shortleaf pine	1,255,000	10.60	13,305.00	1,255,000	.....
Cypress	565,000	15.09	8,527.50	.....	565,000
White oak	50,000	15.00	750.00	50,000	.....
Red oak	25,000	13.00	325.00	25,000	.....
Chestnut	10,000	16.50	165.00	10,000	.....
Totals	6,925,000	$12.72	$75,492.50	6,360,000	565,000

INSULATOR PINS, BRACKETS, AND CROSS ARMS

Under Table 8 was discussed the kinds of wood used in underground construction for the distribution of telephone, telegraph, and electric power, but in Table 17 the statistics represent woods used for the construction and manufacture of over head lines. The commodities which make up the table are cross-arms, insulator pins, and brackets, pole steps, and tree blocks. Telephone and telegraph poles are not included because they do not come within the range of this study. Statistics concerning these products are given in Circular 9 issued by the Bureau of the Census.

The raw material for making insulator pins and brackets was purchased in the form of bolts and reported in terms of cords. For convenience in tabulation the number of cords were reduced to board feet. Locust, white oak, and hickory were the woods used, the first named greatly exceeding in quantity the other two. The most exacting demand for locust is for these commodities. Its durability in exposed positions recommends it probably above all other woods for this use, though white oak, owing to the scarcity of locust, is meeting a growing demand for pin wood. In North Carolina the quantity consumed exceeded the quantity of locust. White oak is not considered as durable an outdoor wood as locust, and for that reason white oak pins are usually dipped in paint or in other preservative solutions like zinc chloride or creosote oil. White oak alone was reported for pole steps and tree block. Hickory pins on account of their superior strength were used for holding the heavy porcelain insulators used on high-tension lines.

Longleaf pine and shortleaf pine were the only woods reported for cross-arms. Excepting a small per cent of Virginia-grown shortleaf pine all of the cross-arm wood came from the sawmills operating in States further South. It was purchased in the form of squares and the operations of shaping the arms by machinery and boring holes for the insulator pins and for the bolts holding them to the poles was simple and rapid. All the cross-arms produced in Virginia in 1911 were impregnated with the oil of creosote before they were marketed. In other States, important woods for cross-arms are Douglas fir, cypress, spruce, and loblolly pine.

TABLE 17.—INSULATOR PINS, BRACKETS, AND CROSS-ARMS.

KIND OF WOOD	Total quantity used annually. Feet B. M.	Average cost per 1,000 ft. f. o. b. factory	Total cost f. o. b. factory	Grown in Va. Feet B. M.	Grown out of Va. Feet B. M.
Locust	2,279,000	$22.86	$52,200.00	1,500,000	779,000
Longleaf pine	1,500,000	25.00	37,500.00	.....	1,500,000
White oak	1,321,000	25.00	18,026.00	1,246,000	75,000
Shortleaf pine	750,000	20.00	15,000.00	250,000	500,000
Hickory	25,000	20.00	1,000.00	25,000	.....
Loblolly pine	218	40.00	4.36	218	.....
Totals	5,875,218	$21.06	$123,730.36	3,021,218	2,854,000

FIXTURES

Material used in Virginia for making furnishings of fixtures for stores, offices, bar rooms, banks, and churches has been grouped under Table 18. Owing to the close relation of the products of this industry with high grade interior finish, grills, and mantels made by sash and door factories, a number of manufacturers submitted reports covering the manufacture of commodities belonging to both industries. The separation of the data proved not only very difficult but the division was more or less inaccurate in a number of cases because estimates had to be depended upon.

Fixtures consist of counters, show cases, soda fountains, bar buffets, display racks, partitions, shelving, cabinets, church altars, chancel furnishings, pews, etc. The woods used are of many varieties chosen for their handsome figure and their quality to take a high polish and to present an attractive finish. The average price paid for this material was above that for any other industry except for lumber going into ships and boats, and that used for patterns in iron foundries.

White and red oak, chestnut, sweet birch, shortleaf pine, ash, black walnut, red gum, and butternut were the domestic woods; and rosewood, mahogany, Circassian walnut and jarra the foreign woods, used for the exterior work. They have been named in the order of their importance as to quality, and some of them were in the form of veneer. The interior or hidden work was served by cheaper woods. Yellow poplar, longleaf pine, cypress, and basswood were important ones. Western red cedar was the only Pacific Coast wood made into fixtures and this industry the only one in Virginia reporting its use. Jarra, a (*Eucalyptus marginata*) imported from Australia, was used for the bottom of show cases and display windows.

ILLUSTRATION VII. CYLINDER IN WHICH CROSS ARMS WERE TREATED.

ILLUSTRATION VIII. A LOAD OF TREATED CROSS ARMS BEING REMOVED FROM THE CYLINDER.

TABLE 18.—FIXTURES.

KIND OF WOOD	Total quantity used annually. Feet B. M.	Average cost per 1,000 ft. f. o. b. factory	Total cost f. o. b. factory	Grown in Va. Feet B. M.	Grown out of Va. Feet B. M
White oak	717,500	$44.33	$31,787.50	91,000	626,500
Red oak	669,500	40.30	26,933.50	227,000	442,500
Shortleaf pine	712,000	20.44	14,556.00	412,000	300,000
Yellow poplar	286,000	37.10	10,611.00	54,000	232,000
Chestnut	130,000	28.10	3,650.00	70,000	60,000
Cypress	110,000	41.25	4,550.00	.....	110,000
Sweet birch	97,000	49.33	4,785.00	.....	97,000
White pine	85,000	37.09	3,150.00	50,000	35,000
Longleaf pine	80,000	28.00	2,240.00	80,000	.....
Ash	36,000	32.99	1,187.00	36,000	.....
Mahogany	39,000	165.10	6,439.00	.....	39,000
Black walnut	22,000	62.23	1,369.00	.....	22,000
Basswood (linn)	15,000	15.00	225.00	15,000	.....
Red gum	40,000	42.50	1 700.00	.....	40,000
Sugar maple	12,500	23.04	283.00	12,000	500
Butternut	11,400	41.80	462.00	.....	11,400
Western red cedar	5,000	50.00	250.00	.....	5,000
Rosewood	400	270.00	108.00	.....	400
Circassian walnut	250	187.00	46.75	.....	250
Jarra	100	200.00	20.00	.....	100
Totals	3,068,650	$37.30	$114,352.75	1,047,000	2,021,650

HANDLES

More than 96 per cent of the nearly three million feet of wood used in 1911 for making handles in Virginia comes from trees grown in the State. Ash, based on the amount used, was the principal wood. Most of it was reported as white ash and served for turning long tool handles such as are used for hoes, garden rakes, hay forks, and long handled shovels. Quantities of it also went into short handled railroad shovels, spades, etc.

The toughness, strength, and resiliency of hickory makes it distinctively the best suited wood for axe, pick, hammer and sledge handles. No satisfactory substitute has as yet been found to compete with it. White oak is used to a limited extent, but more on account of hickory's scarcity and high price than owing to white oak's special qualification. The choicest butt cuts of hickory are desired by the handle makers and rarely does any but the white or sap wood of the tree find its way into these finished commodities. Specifications of purchasers of large quantities of hickory handles like railroad and mining corporations seldom admit handles made wholly or in part from the heartwood which is most often spoken of as red hickory. Experiments made by the Forest Service, however, show red hickory equally as strong, weight for weight, as white hickory and highly suitable for handles. Maflet, maul, and other small tool handles were turned both from ash and hickory, the quantity of hickory exceeding the quantity

of ash. Doubtless much waste material resulting from the manufacture of longer handles was utilized in making these short ones, commercially spoken of as edge-tool handles.

Red gum and sycamore met uses similar to the ash for the long handles of garden tools. These woods were also demanded with white oak, sugar maple, and sweet birch for saw handles of many and various designs. Dogwood went into mallet handles but the particular use of basswood handles was not mentioned. Except small quantities of hickory and dogwood, all of the handle material grew in the State.

TABLE 19.—HANDLES.

KIND OF WOOD	Total quantity used annually.				
	Feet B. M.	Average cost per 1,000 ft. f. o. b. factory	Total cost f. o. b. factory	Grown in Va. Feet B. M.	Grown out of Va. Feet B. M.
Ash	1 718,000	$17.34	$29,781.00	1,718,000	.....
H'ckory	992,500	30.34	30,130.00	942,500	50,000
Red gum	80,000	13.00	1,040.00	80,000	.....
Sycamore	55,000	14.09	775.00	5,000	50,000
Dogwood	50,000	19.00	950.00	50,000	.....
White oak	40,000	31.25	1,250.00	40,000	.....
Sugar maple	25,000	25.00	625.00	25,000	.....
Sweet birch	20,000	19.00	380.00	20,000	.....
Basswood (linn)	12,500	13.00	162.50	12,500	.....
Tota's	2,993,000	$21.75	$65,093.50	2,893,000	100,000

AGRICULTURAL IMPLEMENTS

The manufacture of plow beams, rungs, and plow handles required the largest part of the wood represented in Table 20. White oak and red oak were the woods used, but nearly three times as much of the former was reported as of the latter. Not all of the beams and plow handles made in the State are used by the Virginia plow manufacturers. Many are sent bundled together into other States and there assembled with the iron parts of the plow into the finished product. White oak supplied the largest part of the material for making whiffletrees and singletrees. The rest of the demand was met by hickory.

Peanut pickers, tobacco machinery, fertilizer distributors, corn, cotton, and peanut planters and grain cradles were the other agricultural implements made in Virginia which were grouped under this industry. Longleaf pine and white oak in quantity were the woods principally employed for the peanut pickers, though the ash, and yellow poplar having the particular qualifications for the parts for which they were used were equally essential. Implements for tilling, harvesting, and curing of tobacco crops possessing a few wooden parts were made

principally from longleaf pine, red oak, sugar maple, and cypress. The manufacturers of fertilizer distributors and planters reported only white oak and ash. The handles of these implements made of red gum and ash were purchased from the plow handle makers, ready for use.

Grain cradles are manufactured from hickory and ash. The braces and fingers were of hickory, the snathes of white ash. Ash is also suitable for fingers and a small quantity of it was reported as so used. Nearly two and a half million feet of lumber was the total required for making the products of this industry. Eighty-nine per cent of it was cut from Virginia forests.

TABLE 20.—AGRICULTURAL IMPLEMENTS.

KIND OF WOOD	Total quantity used annually. Feet B. M.	Average cost per 1,000 ft. f. o. b. factory	Total cost f. o. b. factory	Grown in Va. Feet B. M.	Grown out of Va. Feet B. M.
White oak	1,464,000	$22.10	$32,357.50	1,400,000	64,000
Red oak	437,000	20.56	8,985.00	437,000	.....
Ash	331,000	22.38	7,410.00	211,000	120,000
Longleaf pine	65,000	24.31	1,580.00	.....	65,000
Red gum	50,000	13.00	650.00	50,000	.....
Hickory	42,000	40.95	1,720.00	37,000	5,000
Sugar maple	8,000	65.00	520.00	.....	8,000
Yellow poplar	6,000	22.00	132.00	6,000	.....
Cypress	1,000	60.00	60.00	.....	1,000
Totals	2,404,000	$22.18	$53,414.50	2,141,00	263,000

CASKETS AND COFFINS

Only a portion of the coffins and caskets used in Virginia are made in the State. Many are manufactured elsewhere and shipped in ready for use but they are not taken into account in this report. The rest of the demand is met by local cabinet makers who manufacture a few handmade coffins each year. The quantity of wood used by the cabinet makers is very slight and as they are so widely distributed throughout the State, the gathering of information from them was not attempted. A few large manufacturing plants making burial cases from a high-grade mahogany casket down to a cheap yellow poplar coffin are the ones who consumed the largest portion of the material shown in Table 21.

The popularity of caskets has greatly lessened the demand for coffins. Before the time of the factory-made caskets, the coffin was the burial case most frequently used. Black walnut served as the principal wood for the better grades; while the cheaper coffins were,

as they are to-day, made from soft woods which when stained, grained and varnished, imitate hardwoods. Coffins are irregular in shape. They are widest near one end, corresponding to the shoulders of a person, and from there slope towards each end. Yellow poplar is the principal coffin wood, which with black walnut met the entire demand in Virginia.

Caskets are rectangular. Some of them have rounded corners, and in others, the corners are cut off and squared, giving the casket something of an octagonal appearance. Nearly all caskets are cloth covered, and this permits the use of low grades of lumber. Chestnut, based on the quantity used, is the most important American casket wood. Other caskets, usually the high-priced ones, are richly carved and finished in the natural wood. White oak, mahogany, and walnut, selected for their beauty of grain, served for making these. Over three-fourths of the total reported by the Virginia casket makers was chestnut. Red cedar, white oak, and mahogany consituted the rest. Virginia manufacturers did not report buying cypress which is the principal casket wood used in Missouri and the southern Mississippi Valley States. In Oregon and Washington, western red cedar has proved a most valuable wood for casket making and is used in large quantities. Sitka spruce is also employed.

Lumber consumed for making outer cases, sometimes called rough boxes, is included in the statistics of this industry. The woods reported for this use by the Virginia manufacturers were chestnut, yellow poplar, hemlock, shortleaf pine, white pine, and red cedar.

TABLE 21.—CASKETS AND COFFINS.

KIND OF WOOD	Total quantity used annually.				
	Feet B. M.	Average cost per 1,000 ft. f. o. b. factory	Total cost f. o. b. factory	Grown in Va. Feet B. M.	Grown out of Va. Feet B. M.
Chestnut	719,896	$14.99	$10,797.45	583,264	136,632
Yellow poplar	355,000	18.10	6,425.00	305,000	50,000
Hemlock	300,000	11.00	3,300.00	300,000	.....
Shortleaf pine	69,450	18.75	1,302.19	69,450	.....
White pine	60,000	17.50	1,050.00	10,000	50,000
Walnut	21,000	39.95	830.00	10,000	11,000
White oak	16,000	30.00	480.00	16,000	.....
Red cedar	15,000	50.00	750.00	.....	15,000
Mahogany	10,000	160.00	1,600.00	.....	10,000
Totals	1,566,346	$17.08	26,534.64	1,293,714	272,632

CHAIRS

White oak and red oak constituted nearly six-sevenths of the material demanded by the Virginia chair makers. The prices paid for

these woods were over $5 and $3, respectively, less than the white and red oak reported by the furniture manufacturers. Dining-room chairs, rockers, and light bed-room chairs finished natural with wax or varnish, constituted the principal commodities made. The increasing popularity of Mission furniture in recent years, has favored the makers of oak chairs by increasing the demand. Oak is the principal wood used for Mission designs and a fairly large per cent of the products of the Virginia chair factories were made after these patterns. Sugar maple was made into turned chair stock and the ash reported went into mess benches used on board of large vessels.

TABLE 22.—CHAIRS.

	Total quantity used annually.				
KIND OF WOOD	Feet B. M.	Average cost per 1,000 ft. f. o. b. factory	Total cost f. o. b. factory	Grown in Va. Feet B. M.	Grown out of Va. Feet B. M.
White oak	410,000	$16.92	$6,725.00	285,000	125,000
Red oak	205,000	18.30	3,475.00	205,000	.....
Sugar maple	120,000	11.50	1,380.00	120,000	.....
Ash	30,000	58.00	1,740.00	.....	30,000
Mahogany	5,000	160.00	800.00	.....	5,000
Total	770,000	$18.34	$14,120.00	610,000	160,000

DAIRY, POULTRY, AND APIARIST SUPPLIES

Various commodities made of wood are used by the dairyman, the poultry raiser, and the apiarist. Churns, firkins, and butter moulds are examples of the first named; incubators, coops, and nest boxes of the second, and beehives, their compartments, and honey shipping cases of the third.

The only dairyman's articles manufactured in Virginia are butter churns. Ash is the wood used; and in all of the States so far studied for wood utilization, this kind of wood constitutes the principal churn material. Most of the ash delivered to the Virginia factories comes from without the State, North Carolina furnishing the largest part.

Beehives being placed in the open, exposed to the elements, are in situations which favor decay. They are therefore usually well painted with oil and leads before leaving the factory, which preserves the outside, but to retard decay from the inside moisture, the natural decay-resisting properties of the lumber used are depended upon. Woods are selected with this point in view. Like the makers of apiarist supplies in Wisconsin and Michigan, where probably the largest number of beehives are made, the Virginia manufacturers use white

pine. It went into the hive proper, while basswood was used for the honey sections. Cypress and redwood, like white pine, are favorite out-door woods and are called on extensively in other States to meet the demands of the beehive makers.

All of the incubators, brooders, and other apparatus, except coops, used in Virginia by poultry raisers are shipped in from other States. Chicken coops of many kinds, and especially crate coops for shipping live poultry, are home made and large quantities of material annually are required for making them. They are constructed with a view of being as light as is consistent with the rough treatment they receive and as strong as possible. The frames of the coops are mostly chestnut, the rods or rungs of hickory and the bottoms of some wood light in weight, usually poplar, basswood and cucumber. Another design of crates and coops growing in favor is the woven bottom coops. These have poultry wire stretched over bent hickory ribs. The bottoms are made of thin strips, split or shaved from white oak, black oak, white ash, and probably cottongum. They are woven together in the same fashion as the common splint basket. All of the material used for coops was from Virginia grown timber.

TABLE 23.—DAIRY, POULTERERS AND APIARIST SUPPLIES.

KIND OF WOOD	Total quantity used annually.				
	Feet B. M.	Average cost per 1,000 ft. f. o. b. factory	Total cost f. o. b. factory	Grown in Va. Feet B. M.	Grown out of Va. Feet B. M.
Ash	360,000	$19.30	$6,950.00	10,000	350,000
Yellow poplar	135,000	13.62	1,838.25	135,000	.....
Hickory	58,200	19.97	1,158.50	58,200	.....
White pine	26,000	18.00	468.00	26,000	.....
Chestnut	24,000	14.17	340.00	24,000	.....
Basswood (linn)	20,200	12.90	258.00	20,200	.....
Cucumber	12,000	10.00	120.00	12,000	.....
Cotton gum (Tupelo)	10,000	13.00	130.00	10,000	.....
White oak	2,000	10.00	20.00	2,000	.....
Totals	647,400	$17.44	$11,282.75	297,400	350,000

SHUTTLE BLOCKS.

This industry concerns the manufacturing of rough shuttles which afterwards are sent to other factores to be finished and polished. Bobbins are usually made by the same concerns, but in Virginia none of the shuttle makers reported turning them. Dogwood and persimmon are the principal woods the country over for shuttle making, and for this purpose they both meet their most exacting demand. Persimmon is probably used in the larger quantities. In Virginia, however, the

case is reversed. Here the stand of dogwood is more plentiful and the quantity of it going into the rough shuttle manufacture naturally exceeds the amount of persimmon. Table No. 24, giving the available statistics, shows that this industry and the excelsior makers were the only ones securing all of their raw material from Virginia grown timber.

TABLE 24.—SHUTTLE BLOCKS.

	Total quantity used annually.				
KIND OF WOOD	Feet B. M.	Average cost per 1,000 ft. f. o. b. factory	Total cost f. o. b. factory	Grown in Va. Feet B. M.	Grown out of Va. Feet B. M.
Dogwood	616,400	$13.70	$8,437.40	616,400	.....
Persimmon	15,000	14.00	210.00	15,000	.....
Totals	631,400	$13.71	$8,647.40	631,400	.....

TOBACCO BOXES

Tobacco-box manufacture being a distinct industry from box making, the material used for making them is presented in separate statistics. Plug tobacco boxes, cigar boxes, and tobacco retainers were the commodities made in Virginia and included in Table 25. Red oak, white oak, sycamore, and red gum were the woods used for plug tobacco boxes. The sugar maple alone served as material for retainer sides, and yellow poplar and red gum with Spanish cedar and African cedar met the demand of the cigar-box makers.

Cigar-box material is bought in the form of thin lumber and veneer, the former usually 5-32 of an inch in thickness. This material as is customary was purchased and reported by superficial measure. To make it comparable with the other tables of this report it was reduced to board measure and the prices correspondingly raised. According to square measure the prices ranged from $20 to $30 for Spanish cedar and African cedar, $14 to $16 for yellow poplar and $12 to $14 for red gum. Many of the cigar boxes were made of two-ply veneer. Spanish cedar served as the exterior layer glued to the cheaper domestic veneers like yellow poplar or red gum.

Plug tobacco boxes are lock-cornered, and like all lock-cornered boxes they demand gluing. "The bevel-locked", although not as much as formerly, still remains in use. The bottoms of plug tobacco boxes are often made of three-ply veneer, and sycamore and red gum are favorite woods for this use. Solid bottoms and tops are also used, and like the sides are made principally of white oak and red oak.

TABLE 25.—TOBACCO BOXES.

KIND OF WOOD	Total quantity used annually. Feet B. M.	Average cost per 1,000 ft. f. o. b. factory	Total cost f. o. b. factory	Grown in Va. Feet B. M.	Grown out of Va. Feet B. M.
Red oak	175,000	$13.43	$2,350.00	175,000	.....
White oak	125,000	13.52	1,700.00	125,000	.....
Sycamore	100,000	27.50	2,750.00	.....	100,000
Sugar maple	23,450	35.00	820.75	.....	23,450
Yellow poplar	20,000	68.00	1,360.00	.....	20,000
Red gum	5,000	52.00	260.00	.....	5,000
Spanish cedar	5,000	120.00	600.00	.....	5,000
African cedar	1,100	138.00	151.80	.....	1,100
Totals	454,550	$21.92	$9,992.55	300,000	154,550

PATTERNS

Table 26 shows the kinds of woods purchased and used for foundry flasks and patterns. There are manufacturers in Virginia who specialize in pattern making and sell their products to foundry men, while a number of foundries have pattern departments in connection and merely manufacture their own requirements. Foundry flasks are frames holding the sand which is worked into relief shape ready to receive the molten metal. The flask woods are not of high grades like the pattern woods. Patterns are carefully cut from lumber into the exact form of the article to be cast. White pine in all States is the principal pattern wood and much of it shown in the table, especially the high grades, went for this use. A large part of the white pine was shipped from the Lake States. Close-grained woods, with inconspicuous figure and without resin, are the kinds the pattern makers demand. Besides white pine, cherry and yellow poplar were used, while the other wood shown in the table and yellow poplar went into the foundry flasks. The average price of the woods grouped under this industry exceeded twofold the cost of the same woods reported by another class of manufacturers shown in this report. This high price is because only the highest grades of expensive woods are used for the commodities mentioned. Only one-sixth of the material made into flasks and patterns came from forests of the State.

TABLE 26.—PATTERNS.

KIND OF WOOD	Total quantity used annually. Feet B. M.	Average cost per 1,000 ft. f. o. b. factory	Total cost f. o. b. factory	Grown in Va. Feet B. M.	Grown out of Va. Feet B. M.
White pine	111,400	$91.24	$10,177.00	7,000	104,400
Yellow poplar	12,000	30.00	360.00	10,000	2,000
Cherry	5,400	43.80	219.00	5,000	400
Basswood (linn)	2,000	42.00	84.00	.....	2,000
Totals	130,800	$83.74	$10,840.00	22,000	108,800

MISCELLANEOUS

The products of those factories which could not be listed as separate industries without revealing the identity of the informant are grouped under Table 27. The twenty-two woods shown in the list aggregate over eight and three-fourths million feet. Fifty-one per cent of it was grown in Virginia and it was bought at a price $2.31 less than the cost of woods shipped in from other States. The demands of two establishments making plumbers' woodwork like exterior tank linings and closet seats accounts for a large part of the white oak and red oak shown in the table. This line of manufacture is of considerable importance in Virginia

The makers of washing machines for domestic uses call on the cypresses and the juniper (white cedar) to serve as raw material, while for wash tubs and portable wood bath tubs, juniper alone met the demand. Drugget and rug poles were made from the black gum and red gum and clothes pins were turned from cotton gum. The success of gum clothes pins calls attention to a new wood for a use long held by beech, maple, and birch.

Dogwood croquet and duckpin balls and white ash baseball bats were made in Virginia; the quantity of these woods as they appear in Table 27 were for these uses. White and red oak, black walnut, and red gum served for the exterior work of reed organs. The action and many interior parts were made from sugar maple, yellow poplar, sycamore, red gum, and white pine.

Silo makers reported only two woods for silo staves, longleaf yellow pine, and white pine. Sugar maple alone went into the wood parts of cider and wine presses.

Virginia consumes more wood than any other State for the manufacturing of porch and venetian blinds. From the standpoint of wood utilization this is a most important industry. Twenty-four woods were used of which all but the white pine, spruce, yellow poplar, and silverleaf maple were high-grade expensive cabinet woods. A number of them were foreign woods including silver ava and Philippine walnut which so far have appeared in the wood-using report of no other State

TABLE 27.—MISCELLANEOUS.

KIND OF WOOD	Total quantity used annually. Feet B. M.	Average cost per 1,000 ft. f. o. b. factory	Total cost f. o. b. factory	Grown in Va. Feet B. M.	Grown out of Va. Feet B. M.
White cedar	4,792,000	$19.40	$93,148.00	1,568,000	3,224,000
Black gum	1,000,000	12.00	12,000.00	1,000,000	.....
Cypress	640,000	15.25	9,702.40	.....	640,000
Red oak	425,000	18.94	8,050.00	375,000	50,000
Chestnut	310,000	16.90	5,240.00	300,000	10,000
White oak	242,000	23.53	5,803.00	142,000	100,000
Yellow poplar	228,000	21.11	4,595.00	203,000	25,000
Ash	218,000	31.60	6,884.00	210,000	8,000
Black walnut	202,200	30.80	6,224.00	200,200	2,000
White pine	190,000	26.19	4,970.00	70,000	120,000
Red gum	68,200	22.79	1,550.00	68,000	200
Dogwood	67,000	15.00	1,005.00	37,000	30,000
Cotton gum (Tupelo)	62,000	9.00	558.00	62,000	.....
Sugar maple	55,000	18.19	1,000.00	55,000	.....
Sycamore	52,000	16.52	860.00	50,000	2,000
Loblolly pine	50,000	15.00	750.00	50,000	.....
Longleaf pine	30,000	40.00	1,200.00	.....	30,000
Spruce	30,000	40.00	1,200.00	30,000	.....
Silver maple (soft)	10,000	30.00	300.00	10,000	.....
Mahogany	5,000	180.00	900.00	.....	5,000
Butternut	5,000	60.00	300.00	.....	5,000
Red cedar	5,000	50.00	250.00	5,000	.....
Cherry	2,000	72.00	144.00	.....	2,000
Teakwood	2,000	180.00	360.00	.....	2,000
Rosewood	1,000	600.00	600.00	.....	1,000
Silver ava	1,000	100.00	100.00	.....	1,000
White mahogany	100	200.00	20.00	.....	100
Circassian walnut	100	200.00	20.00	.....	100
Philippine walnut	100	200.00	20.00	.....	100
Totals	8,692,700	$19.36	$167,753.40	4,435,200	4,257,500

THE USES OF WOOD BY VIRGINIA MANUFACTURERS.

ASH

Baseball Bats
Buggy Poles
Butter Churns
Cabinet Work (Boats)
Cabinet Work (Houses)
Cabinet Work (Passenger Cars)
Cotton Planter Parts
Ditty Boxes
Drays
Fertilizer Distributor Parts
Fingers (Grain Cradles)
Fixtures (Exterior Work)
Frames (Buggy)
Frames (Carriage Bodies)
Frames (Drays)
Frames (Wagon Bodies)
Gear Parts (Vehicle)
Handles
Handles (Contractor's Shovels)
Handles (Grubbing Hoes)
Handles (Hay Fork)
Handles (Hoe)
Handles (Long Shovel)
Handles (Mallet)
Handles (Pitchfork)
Handles (Rake)
Handles (Small Tools)
Handles (Spade)
Head Blocks (Wagon)
Interior Finish (Houses)
Furniture (Case Goods)
Hay Ladders (Farm Wagons)
Locomotive Cabs
Mess Benches (Boats)
Mess Tables (Vessels)
Moulding (Window)
Panels (Wagon Bodies)
Partitions (Store and Office)
Peanut Picker Parts
Peanut Planter Parts
Poultry Coop Bottoms
Sanitary Wardrobes
Snathes (Grain Cradles)
Stools
Tables (Kitchen)
Trucks (Tobacco)
Trucks (Factory)
Trucks (Warehouse)
Venetian Blinds
Wainscoting
Wagon Tongues
Wardrobes

BASSWOOD

Balusters
Beehive Sections
Cabinet Drawers
Casing
Ceiling
Drawer Sides (Furniture)
Dust Guards (Cars)
Furniture (Hidden Work)
Handles
Mirror Backing
Partitions
Passenger Cars (Interior Work)
Porch Columns
Poultry Coop Bottoms
Siding
Store and Office Fixtures (Interior Work)

BEECH

Flooring

BIRCH (SWEET)

Cabinets
Cabinet Work (Passenger Cars)
Couches
Davenports
Ditty Boxes
Doors
Fixtures
Flooring
Furniture (Case Goods)
Handles (Saw)
Handles (Rake)
Handles (Hoe)
Interior Finish (House)
Lounges
Panels
Partitions (Office)
Parlor Furniture (Frames)
Sash
Stair Balusters
Stair Rails
Stair Rises
Stair Treads
Store and Office Fixtures (Exterior)
Wardrobes
Wainscoting

BUCKEYE

Casing
Ceiling
Cornice
Door Frames
Partition
Sash
Siding
Window Frames

BUTTERNUT

Cabinet Work (Boats)
Cabinet Work (Cars)
Store and Office Fixtures (Exterior)
Venetian Blinds

CEDAR (AFRICAN)

Cigar Boxes

CEDAR (RED)

Casket Shells
Cedar Chests
Furniture
Outer Boxes (Caskets)
Venetian Blinds

CEDAR (SPANISH)

Cigar Boxes

CEDAR (WHITE)

Boat Boards
Boat Siding
Boats (Superstructure)
Buckets
Candy Pails
Lard Buckets
Pails
Tubs (Bath)
Tubs (Washing)

CHERRY

Boat Linings
Cabinet Work (Boats)
Cabinet Work (Passenger Cars)
Furniture (Case Goods)
Interior Trim (House)
Molds (Foundry)
Patterns (Foundry)
Store and Office Fixtures (Exterior)
Venetian Blinds

CHESTNUT

Boxes (Cheese)
Boxes (Glass Bottles)
Boxes (Handle)
Boxes (Meat)
Cabbage Crates
Casing
Casket Moulding
Casket Shells
Casket Tops
Church Pews
Cores (Veneer)
Crating
Doors
Fence Pickets
Fence Stubs
Flooring
Furniture (Backs)
Furniture Frames (Case Goods)
Furniture (Kitchen)
Interior Finish (House)
Outer Cases (Caskets)
Panel Work (House)
Pool Table Sides
Ribs (Poultry Coops)
Sash
Siding
Stair Balusters
Stair Rises
Stair Rails
Store and Office Partitions
Wardrobes

COTTONWOOD

Panels 3-ply (Trunks)
Sample Cases
Templets (Boats)
Trunk Boxes

CUCUMBER

Bottoms Poultry Coops
Ceiling
Partition
Porch Columns
Siding

CYPRESS

Blinds
Boat Bottoms
Boat Sides
Boat Construction (Superstructure)
Box Cleats
Box Shooks
Candy Pails
Casing
Cornice
Decking (Boats)
Doors
Door Frames
Fence Pickets

Fence Stubs
Fixtures (Interior Work)
Flooring (Porch)
Interior Trim
Lard Buckets
Moulding
Pails
Partition
Porch Blinds
Porch Columns
Sash
Siding
Staging (Boat)
Stepping
Store Fronts
Tanks
Tobacco Machinery Parts
Trunk Slats
Wagon Top Strips
Wardrobes
Window Frames
Window Sills
Venetian Blinds

DOGWOOD

Bowling Balls
Croquet Balls
Shuttle Blocks
Spools

DOUGLAS FIR

Barges
Cabinet Work (Boats)
Casing
Cornice
Decking (Boats)
Kelsons
Locomotive Cabs
Porch Work
Spars
Scows

ELM (ROCK) SLIPPERY)

Basket Rims
Hoops (Veneer Barrels)

ELM (SOFT) WHITE

Bands (Baskets)
Hoops (Veneer Barrels)
Trunk Slats

GUM (BLACK)

Baskets
Berry Cups
Boxes
Box Shooks
Hoppers
Hubs
Keels
Lard Dishes
Malls
Paving Blocks
Reshippers (Bottle Crates)
Rollers (Boats)
Rug Poles
Table Legs
Veneer Barrels

GUM (COTTON)

Baskets
Berry Cups
Boxes (Cracker)
Boxes (Dovetail)
Boxes (Interlocking)
Clothes Pins
Coop Bottoms (Poultry)
Crates (Reshippers)
Crating
Hoppers
Lard Dishes
Reshippers (Beer)
Sample Cases
Table Legs
Tills
Traveling Cases
Truck Barrels (Veneer)
Trunk Boxes
Wooden Dishes

HEMLOCK

Baseboards
Boxes
Box Shooks
Crates
Flooring (Sub)
Interior Trim (House)
Moulding (Window)
Outer Cases (Casket)
Sheathing
Siding

HICKORY

Axles
Braces (Grain Cradles)
Buggy (Gear Parts)
Drays
Fingers (Grain Cradles)
Handles (Ax)
Handles (Boats)
Handles (Chisel)
Handles (Hammer)
Handles (Mall)
Handles (Mallet)
Handles (Mattock)
Handles (Pick)
Handles (Small Tool)
Handles (Saw)
Hounds (Wagon)
Insulator Pins
Perches (Wagon)
Poles (Buggy)
Posts (Wagon Bodies)
Reaches (Vehicle)
Rims
Road Carts
Rods (Poultry Crates)
Rungs (Poultry Coops)
Shafts (Vehicle)
Single Trees
Spring Bars
Spokes
Tobacco Machinery Parts
Tobacco Truck Parts
Trunk Slats
Vehicle Stock
Wagon Tongues
Wheels (Vehicle)
Whiffle Trees

JARRA (AUSTRALIAN EUCALYPTUS)

Wardrobes (Flooring)
Show Window Displays

LOCUST

Insulator Brackets
Insulator Pins
Trunnels (Boats)
Spokes (Boat Wheels)

MAHOGANY

Cabinet Work (Boats)
Cabinet Work (Passenger Cars)
Caskets
Casket Shells
Chairs
Couch Frames
Davenports
Doors
Furniture (Exterior Work)
Interior Finish (House)
Landing Posts
Newel Posts
Patterns (Foundry)
Pool Tables Sides
Stair Rails
Stair Rises
Stair Treads
Store and Office Fixtures (Exterior)
Table Leaves
Table Tops

MAHOGANY (WHITE)

Venetian Blinds

MAPLE (SOFT) SILVER

Kitchen Tables
Porch Blinds
Venetian Blinds

MAPLE (SUGAR)

Bedsteads
Bed Slats
Chairs
Chairs (Porch)
Chiffoniers (Exterior Work)
Drawer Sides
Display Backs
Flooring
Furniture (Exterior)
Handles (Saw)
Kitchen Tables
Locomotive Cabs (Floors)
Parlor Furniture (Frames)
Pipe Organs (Interior Work)
Pool Table Sides
Reed Organs (Interior Parts)
Table Slides
Tobacco Machinery Parts
Tobacco Retainer Sides
Stands (Bedroom)
Wagon Bodies (Bottoms)

OAK (BLACK)

Bedsteads
Box Shooks
Buffets
Dressers (Exterior Parts)
Flooring
Furniture (Case Goods)
Interior Finish (House)
Plug Tobacco Boxes
Sideboards (Exterior Work)
Washstands

OAK (RED)

Baseboards
Bedposts
Bedrails
Bedsteads
Boat Construction
Boxes
Box Shooks
Buffets
Buggy Bodies (Bottoms)
Bureaus
Cabinets (Boat)
Cabinets (Passenger Cars)
Casing
Caskets
Ceiling (Boats)
Ceiling (House)
Chairs
Chairs (Dining)
Chairs (Rocking)

Chairs (Mission)
Chiffoniers (Exterior Work)
China Closets
Church Altars
Coffins
Commodes
Couch Frames
Davenport Frames
Desks (Office)
Doors
Drays
Dressers
Felloes (Wagon)
Fence Pickets
Fixtures (Exterior)
Flooring
Furniture (Case Goods)
Handles (Saw)
Hounds (Wagon)
Insulator Brackets
Interior Finish (House)
Kitchen Cabinets
Landing Posts
Lounge Frames
Mantels
Newel Posts
Panels (Furniture Sides)
Pilasters (Furniture)
Pilasters (Mantels)
Pilots (Locomotive)
Pipe Organs (Exterior)
Platforms (Cars)
Plow Beams
Plow Handles
Plow Rungs
Plug Tobacco Boxes
Pole Steps (Telephone)
Reading Desk (Church)
Reed Organs (Exterior Work)
Rims (Wagon)
Road Carts
Sash
Sheathing
Sideboards
Spokes
Stair Balusters
Stair Rails
Stair Rises
Stair Treads
Stairwork
Stands (Bedroom)
Stretchers (Table)
Tables (Extension)
Tables (Library)
Table Leaves
Table Slides
Table Tops
Telephone Boxes
Thresholds
Tobacco Machinery Parts
Toilet Seats
Tree Blocks
Truck Parts (Cars)
Venetian Blinds
Wagon Bodies (Framework)
Wardrobes
Washstands
Window Sills

OAK (WHITE)

Altars (Church)
Altars (Lodge Room)
Baseboards
Barge Construction
Bedposts
Bedrails
Bed Slats
Bedsteads
Bitts (Boat)
Boat Construction
Body Bolsters (Freight Cars)
Bolsters (Freight Cars)
Box Shooks
Buffers (Cars)
Buffets
Buggy Bottoms
Bureaus
Cabinets
Cabinet Work (Boats)
Capping (Boats)
Casing
Caskets
Ceiling (Boats)
Ceiling (House)
Chairs
Chairs (Dining)
Chairs (Mission)
Chairs (Rocking)
Chiffoniers (Exterior Work)
China Closets
Church Pews
Chute Boards (Cars)
Cider Presses
Coffins
Commodes
Couch Frames
Cotton Planters
Davenports
Desks (Office)
Doors
Draft Timber (Freight Cars)
Drays
Dressers
Dump Carts (Bodies)
End Sills (Freight Cars)
Engine Beams (Freight Cars)
Felloes (Wagon)
Fence Pickets
Fertilizer Distributors
Fixtures (Exterior Work)
Flooring
Flooring (Boats)
Frames (Wagon Bodies)
Furniture (Case Goods)
Guards (Boats)
Handles
Handles (Saw)
Hounds (Wagon)
Hubs
Insulator Brackets
Insulator Pins
Interior Finish (Horse)
Keel Blocks (Boats)
Kelsons (Boats)
Kitchen Cabinets
Log Trucks (Freight Cars)
Lounges
Locomotive Bumpers
Mantels
Panels
Partitions
Peanut Pickers
Peanut Planters
Pilasters (Furniture)
Pilasters (Mantels)
Pilots (Locomotive)
Pipe Organs (Exterior Parts)
Pool Table Rails
Pool Table Sides
Pole Steps
Planking (Motor Boats)
Platforms (Cars)
Plow Beams
Plow Handles
Plow Rungs
Plug Tobacco Boxes
Rails (Boats)
Reed Organs (Exterior Work)
Reading Desks (Church)
Rims
Road Carts
Rungs (Poultry Coops)
Sash
Scows
Shafts (Dump Cart)
Sheathing
Sideboards
Sills (Wagon Bodies)
Single Trees
Spokes
Spring Bars (Buggy)
Stands (Bedroom)
Stair Balusters
Stair Rails
Stair Rises
Stair Treads
Stairwork
Sterns
Stretchers (Table)
Surgical Splints
Tables
Tables (Extension)
Table Leaves
Tables (Library)
Table Slides
Table Tops
Telephone Boxes
Tie Beams (Cars)
Thresholds
Tobacco Truck Frames
Toilet Seats
Tree Blocks
Truck Bolsters (Freight Cars)
Truck (Freight Cars)
Venetian Blinds
Wagon Bodies (Bottoms)
Wagon Gear Parts
Wagon Tongues
Wagon Tops (Ribs)
Wardrobes
Washstands
Whiffle Trees
Window Sills

OSAGE ORANGE

Hounds (Vehicle)

PERSIMMON

Shuttle Blocks

PINE (LOBLOLLY)

Balusters
Baseboards
Basket Bottoms
Blinds
Boat Construction
Boxes
Boxes (Coffee)
Boxes (Dry Goods)
Box Shooks
Cabbage Crates
Cabinets
Car Decking
Car Siding
Casing
Ceiling
Clapboards
Coffins
Conduits
Cornices
Crating
Decking (Freight Cars)
Doors
Door Frames
Dunnage (Freight Cars)
Excelsior
Fixtures
Furniture Backs
Furniture (Veneer Cores)
Flooring
Flooring (Factory)
Flooring (Freight Car)
Grain Doors
Insulator Pins
Interior Trim (House)
Kitchen Safes
Landing Posts
Lining (Freight Cars)

Mouldings
Newel Posts
Outer Cases (Casket)
Panels (Furniture Sides)
Partition
Pilasters
Poultry Coop (Bottoms)
Roofers
Sample Cases
Sash
Screens (Door)
Screens (Window)
Siding
Siding (Freight Cars)
Stair Rails
Stairways
Store Fronts
Trunk Boxes
Wagon Panels
Wardrobes
Window Frames
Wire Reels

PINE (LONGLEAF)

Balusters
Barge Construction
Boxes
Boxes (Projectile)
Braces (Freight Car)
Bridge Poles (Cars)
Cabbage Crates
Car Decking
Carline
Car Lining
Car Siding
Car Sills
Car Flooring
Corner Post (Freight Cars)
Cross-arms
Cross-tie Timber (Gondola Cars)
Deck Beams (Boats)
Decking (Boats)
Doors
Dump Cart Bottoms
Fixtures (Store and Office)
Flooring
Frames (Freight Cars)
Grain Doors
Head Blocks (Boats)
Hopper Siding (Freight Cars)
Interior Trim (Houses)
Lining (Cars)
Lining Stud (Freight Cars)
Locomotive Parts
Moulding
Paving Blocks
Peanut Pickers
Planking (Boats)
Plates (Cars)
Ridge Pole (Freight Cars)
Roof Ribs (Freight Cars)
Scows
Shelves
Siding (Cars)
Side Planks (Gondola Cars)
Side Plates (Freight Cars)
Sills (Cars)
Silo Staves
Stair Rails
Stair Rises
Stair Treads
Stairways
Stakes (Gondola Cars)
Stepping
Thresholds
Tobacco Machinery Parts
Upper Belt Rails (Freight Cars)
Wagon Bodies (Bottoms)
Window Sills

PINE (SCRUB)

Barn Siding
Boxes
Box Shooks
Casing
Crating
Door Frames
Excelsior
Flooring
Packing Cases
Roofers
Thresholds
Window Frames

PINE (SHORTLEAF

Barges
Boat Construction
Boat Ceiling
Boxes
Boxes (Dry Goods)
Box Shooks
Boats (Superstructure)
Cabin Work (Boats)
Ceiling
Conduits
Crating
Cross-arms
Decking (Cars)
Doors
Door Frames
Fixtures (Store and Office)
Flooring
Flooring (Factory)
Furniture Backs
Interior Trim
Lining (Cars)
Outer Cases (Caskets)
Partitions
Pilasters
Roofers
Sash
Siding (Freight Cars)
Siding (House)
Staging (Boats)
Stepping
Trunk Boxes
Window Frames
Wire Reels

PINE (SUGAR)

Blinds (Window)
Doors
Sash
Storefronts

PINE (WHITE)

Beehives
Blinds
Boxes (Axle)
Boxes (Dovetail)
Boxes (Interlocking)
Box Shooks
Cabinet Work (Passenger Cars)
Casings
Ceiling (Boats)
Ceiling (House)
Crating
Decking (Boats)
Doors
Door Frames
Dresser Backs
Flasks
Furniture Parts
Interior Finish (House)
Locomotive Cab Parts
Mantels
Molds (Foundry)
Moulding
Outer Cases (Coffin)
Outer Cases (Casket)
Panels (Wagon Tops)
Patterns (Foundry)
Pipe Organs (Interior Work)
Porch Columns
Porch Flooring
Poultry Coops (Bottoms)
Reed Organs (Interior)
Reshippers
Screens (Doors)
Screens (Windows)
Siding
Silo Staves
Spars (Boats)
Storefronts
Trunk Boxes
Wardrobes
Window Frames

RED GUM

Barrel Veneer
Baskets
Bedsteads
Boxes (Cracker)
Boxes (Veneer)
Box Shooks
Cabinets
Chiffoniers (Exterior Work)
Commodes
Couches
Crating
Davenports
Dressers (Exterior Work)
Drugget Poles
Flooring
Hoppers (Fruit)
Lids (Fruit Baskets)
Panels (Furniture Sides)
Planter Handles
Plug Tobacco Boxes
Reed Organs
Reshippers (Beer)
Store and Office Fixtures (Exterior Work)
Tills
Tobacco Truck Bottoms
Trunk Boxes (3-ply)
Venetian Blinds
Wagon Panels
Washstands (Exterior Work)

ROSEWOOD

Pool Table Rails
Venetian Blinds

SASSAFRAS

Furniture (Case Goods)

SILVER AVA

Venetian Blinds

SPRUCE

Boxes
Boxes (Butter)
Box Shooks
Clapboards
Flooring
Spars (Boats)

SYCAMORE

Boxes
Boxes (Veneer)
Box Shook
Filling (Furniture Panels)
Furniture (Case Goods)
Handles (Hoe)
Handles (Rake)
Handles (Saw)
Plug Tobacco Boxes
Reed Organs (Exterior Parts)
Reed Organs (Interior Parts)
Store and Office Fixtures (Int.)
Venetian Blinds

TEAKWOOD

Armor Tacking (Boats)
Pilothouse Work (Boats)
Venetian Blinds

WALNUT (BLACK)

Cabinet Work (Passenger Cars)
Caskets
Coffins
Gun Stocks
Furniture (Case Goods)
Interior Finish (House)
Newel Posts
Pipe Organs (Exterior)
Reed Organs (Exterior Work)
Store and Office Fixtures (Exter.)
Venetian Blinds

WALNUT (CIRCASSIAN)

Fixtures (Exterior Work)
Venetian Blinds

WALNUT (PHILIPPINE)

Venetian Blinds

YELLOW POPLAR

Balusters
Backs (Dresser)
Bands (Berry Baskets)
Bedsteads
Berry Baskets
Blinds
Boxes
Boxes (Axle)
Boxes (Butter)
Boxes (Insulator Pins)
Cabinets
Casings
Casket Shells
Ceiling
Ceiling (Boats)
Cigar Boxes
Clapboards
Coffins
Commodes
Crating
Doors
Doors (Poultry Coops)
Drawer Bottoms
Drawer Sides
Flasks
Filling (Furniture Panels)
Handles
Interior Finish (House)
Kitchen Cabinets
Kitchen Safes
Kitchen Tables
Locomotive Cab Parts
Lounge Frames
Mantels
Mirror Backing
Moulding
Packing Cases
Panels (Delivery Wagon Tops)
Panels (Furniture Sides)
Panels (Interior House Trim)
Panel Sides (Passenger Cars)
Partition
Peanut Pickers Parts
Pilasters (Mantels)
Plug Tobacco Boxes (3-ply)
Pool Table Sides
Porch Blinds
Porch Columns
Porch Posts
Poultry Coop (Bottoms)
Poultry Coops (Frames)
Reed Organ (Interior Parts)
Sample Cases
Sash
Shelves
Siding
Siding (Passenger Cars)
Staging (Boats)
Stair Rises
Spars (Boats)
Traveling Cases
Trunk Boxes
Trunk Compartments
Trunk Trays
Wagon Bodies
Wagon Boxes
Wardrobes
Window Frames

MANUFACTURERS.

AGRICULTURAL IMPLEMENTS.

Clarksville Plow Works,..Clarksville, Va.
Cumberland Planing Mills, Cumber-
.....land, V.a
Buffalo Manufacturing Co., Farmville, Va.
Farmville Manufacturing Co., Farm-
.....ville, Va.
The Chas. E. Hunter, F. F. Plow
Works, ...Fredericksburg Va.
P. Bradley & Sons, ...Harrisonburg, Va.
Lynchburg Foundry Co.. ..Lynchburg, Va.
Look & Lincoln, ...Marion, Va.
C. Billings Son & Co., ...Norfolk, Va.
R. W. Whitehurst, ...Norfolk, Va.
Phenix Planing Mill, ...Phenix, Va.
E. C. Brinser & Sons, ...Richmond, Va.
The Cardwell Machine Co., Richmond, Va.
Starke's Dixie Plow Works, Inc., Rich-
.....mond, Va.
R. B. Hedrick, ...Rural Retreat, Va.
Benthall Machine Co., ...Suffolk, Va.
Vesuvius Plow Works,....Vesuvius, Va.

BASKETS, FRUIT AND VEGETABLE PACKAGES.

Chesapeake Barrel Co., ..Chesapeake, Va.
Greenbush Manufacturing Co.,..Green-
.....bush. Va.
M. J. Kelly, ...Groseclose, Va.
The Peninsula Barrel and Package Co.,
.....Hampton, Va.
A. J. Payne, ...Keokee, Va.
Farmers Manufacturing Co., Norfolk, Va.
Planters Manufacturing Co., ..Port
.....Norfolk, Va.
Planters Manufacturing Co., Pughs,
.....Va.
Kellman & Watson, ...Shady Side, Va.
Nansemond Truck Package Co., Suffolk,Va.
The Toano Truck Package Co., Toano, Va.

BOXES

J. K. Buckley & Sons, ...Abingdon, Va.
Atkins Bros., ...Attoway, Va.
J. E. Stiveley, ...Bealton, Va.
Blackstone Lumber & Manufacturing Co.,
.....Blackstone, Va.
J. Thuma & Son, ...Bridgewater, Va.
G. W. Truitt & Co., ...Capron, Va.
W. H. Vincent, ...Capron, Va.
Jeffreys Spaulding Mfg. Co., Inc.,
.....Chase City, Va.
Claremont Lumber & Box Co., Clare-
.....mont, Va.
Franklin Bros.. .....Colonial Beach, Va.
Wood & Harvey, ...Concord, Va.
F. W. Thayer Co., ...Damascus, Va.
Heidelbach Lumber Co., ...Danville, Va.
The Baker-Minter Lumber Co., Inc.,
....Delaware, Va.
Surry Lumber Co., ...Dendron, Va.
Emporia Manufacturing Co., Emporia, Va.
Greensville Manufacturing Co.,
.....Emporia, Va.
Virginia Buggy Co.,.....Franklin, Va.
The Locust & Pin Co., Front Royal, Va.
Carl Stossel & Co., ...Front Royal, Va.
Greenbush Manufacturing Co.,
.....Greenbush, Va.
Truitt-Vincent Co., ...Jarratt, Va.
Hassinger Lumber Co., ..Konnarock, Va.
F. J. Kress Box Co., Va. Corp.,
.....Kress, Va.
American Box Co., ...Lynchburg, Va.
Hughes Buggy Co., ...Lynchburg, Va.
American Furniture Co.. Martinsville, Va.
Meherrin Planing Mill Co., Meherrin, Va.
Bellows & Squires, Inc.,.....Ocran, Va.
Appomattox Box Shook Co., Inc.,
.....Petersburg, Va.
Petersburg Wood Supply Co., Petersburg,
..... Va.
South Side Manufacturing Co.,
.....Petersburg Va.
Virginia Lumber & Box Co.,
.....Petersburg, Va.
Old Dominion Table Works, Port Nor-
.....folk, Va.
The Alleghany Box Co., ..Richmond, Va.
J. F. Biggs .....Richmond, Va.
The Cardwell Machine Co., Richmond, Va.
Crescent Box & Lumber Co., Roanoke, Va.
David M. Lea & Co., ...Richmond, Va.
Miller Manufacturing Co., Richmond, Va.
E. H. Barnes Co., ...Norfolk, Va.
Berkley Box & Lumber Co., Norfolk, Va.
C. W. Cake, ...Norfolk, Va.
The Dickson Lumber Co., ..Norfolk, Va.
Fosburg Lumber Co., ...Norfolk, Va.
Henry Mayo Box Co., ...Norfolk, Va.
Peart, Nields & McCormick Co., North
.....Emporia, Va.
Surry Lumber Co., ...Norfolk, Va.
Tunnis Lumber Co., ...Norfolk, Va.
Sitterding-Carneal-Davis Co.,
.....Richmond, Va.
The Tredegar Co., ...Richmond, Va.
South Hill Manufacturing Co., Inc.
.....South Hill, Va.
A. L. Matthews, ...Spring Grove. Va.
Montgomery Lumber Co., ...Suffolk, Va.
R. E. Richardson, ...Tunstall, Va.
Winn & Coleman, ...Warfield, Va.

CAR AND LOCOMOTIVE CONSTRUCTION.

Virginia Iron & Coal Co., Fosters Falls,
..... Va.

Chesapeake & Ohio R. R. Co., ...Newport News, Va.
Norfolk & Southern R. R. Co., Norfolk, ... Va.
Norton Car & Foundry Co. Norton, Va.
Seaboard Air Line R. R., Portsmouth, Va.
American Locomotive Co., Richmond, Va.
Chesapeake R. R. Co., ...Richmond, Va.
Richmond, Fredericksburg & Potomac R. R. ..Co., (Hermitage) Richmond, Va.
Sitterding Carneal Davis Co., Rich- .....mond, Va.
Southern Railway, ...Richmond, Va.
The Tredegar Co., ...Richmond, Va.
Washington Southern Railroad Co., ... Richmond, Va.
Norfolk & Western Railway, Roanoke, Va.

CASKETS AND COFFINS.

L. A. Hylton, ...Floyd, Va.
J. A. Willis, ...Keysville, Va.
Newport News, Casket Co., Newport ..... News Va.
Virginia Coffin & Casket Co., Norton, Va.
Richmond Wood Working Co., Richmond, ... Va.
J. C. Close, ...Zeus, Va.

CHAIRS.

Piedmont Chair Co., ...Bassetts, Va.
Close & Hawkins, ...Brightwood, Va.
Wm. H. Kephart, ...Herndon, Va.
U. S. Navy Yard, ...Norfolk, Va.
Troutdale Chair Mfg. Co., Troutdale, Va.
C. W. Alexander & Bros., Waynesboro, Va.
Jas. C. Close, ... Zeus, Va.

EXCELSIOR.

Dillard & Chewning, ...Chilesburg, Va.
Golansville Excelsior Co., Golansville, Va.
W. N. Blatt & Co., ...Milford, Va.
Gray Bros., ...Ruther Glen, Va.
Geo. P. Lyon Excelsior Co. Woodford, Va.

FENCING.

Charlottesville Lumber Co.. Charlottes- .....ville, Va.
King Lumber Co., ...Charlottesville, Va.
Tunis Lumber Co., ...Norfolk, Va.
Hobbs-Hoy Co., ...Petersburg, Va.
Port Norfolk Supply Co., Port Norfolk, Va.
Gray-Lattimer Co., ...Waverly, Va.
The Gray Lumber Co., ...Waverly, Va.
Valley Builders Supply Co., Woodstock, ... Va.

FURNITURE.

M. L. Risheill. .....Alexandria, Va.
Consolidated Furniture Works. Inc., ... Altavista, Va.
Basic Furniture Co., ...Basic City, Va.
Bassett Furniture Co.,.....Main St., ... Bassett, Va.
Virginia Polytechnic Institute, Blacksburg, ... Va.
Phoenix Furniture Corp., ..Cambria, Va.
Nicholson Furniture Co., Chase City, Va.
L. A. Hylton, ...Floyd, Va.
The Galax Furniture Co., ...Galax, Va.
Hampton Normal & Agricultural Institute, ...Hampton, Va.
Wm. H. Kephart, ...Herndon, Va.
Lewis Creek Planing Mill Co., Honaker, ... Va.
Toler & Sons, ...Manchester, Va.
W. C. Seaver & Sons, ...Marion, Va.
Virginia Table Co., ...Marion, Va.
American Furniture Co., Martinsville, Va.
Jas. G. Wilson Mfg. Co., ...Norfolk, Va.
U. S. Navy Yard, ...Norfolk, Va.
Air Line Mfg. Co.,..Port Norfolk Sta., ... Norfolk, Va.
Old Dominion Table Works, Inc., ... Port Norfolk, Va.
J. B. Lacy, ...Pratts, Va.
J. F. Biggs, 521 E. Main St. Richmond, Va.
James River Furniture & Mat. Co., ... Richmond, Va.
C. W. Montgomery, ...Richmond, Va.
Richmond W. W. Co., ...Richmond, Va.
Toler & Sons. .....Richmond, Va.
Central Mfg. Co., ...Roanoke, Va.
Bald Knob Furniture Co., Rocky Mount, ... Va.
T. W. Heath. .....Scottsville, Va.
A. J. Livick, ...Staunton, Va.
C. W. Alexander & Bro., Waynesboro, Va.
Lambert Mfg. Co., ...Waynesboro, Va.
West Point Panel Co., ..West Point. Va.
Valley Builders Supply Co., Woodstock, ... Va.
Wytheville Mfg. Co., ...Wytheville, Va.

FIXTURES.

F. A. Rauch & Sons, ..Eagle Rock, Va.
Chesapeake Mill Co., ...Hampton, Va.
James G. Wilson Mfg. Co., Norfolk, Va.
White Lumber Co., ...Norfolk, Va.
American Furniture & Fixture Co., ... Richmond, Va.
C. P. Dean Corporation, Richmond, Va.
J. C. Fletcher, ...Richmond, Va
C. W. Montgomery, ...Richmond, Va.
Thos. E. Stagg, ...Richmond, Va.
Central Mfg. Co., ...Roanoke, Va.
T. W. Heath, ...Scottsville, Va.
G. W. Fretwell, ...Staunton, Va.
C. W. Alexander & Bro., Waynesboro, Va.

HANDLES.

Atkins Bros., ...Attoway, Va.
H. P. Baker & Co.. .....Columbia, Va.

H. W. & W. W. Beaty, Front Royal, Va.
Carl Stossel & Co., ..Front Royal, Va.
Kenbridge Handle & Spoke Co., Kenbridge, Va.
Hardwood Novelty Co.,.. Powhatan, Va.
M. W. Nicholls ..... Powhatan, Va.
W. E. Dillard Mfg. Co., Petersburg, Va.
E. C. Bruiser & Sons, ...Richmond, Va.
Baldwin Tool Works, ...Richmond, Va.
Blue Ridge Handle Co., ..Round Hill, Va.
J. L. Marcus, ... Round Hill, Va.
Rural Retreat Handle Co., Rural Retreat, Va.
West Point Handle Co., Inc., West Point, Va.

INSULATOR PINS. BRACKETS AND CROSS-ARMS.

American Cross Arm Co., ...Buell, Va.
Brodie Bros. Co., ...Figsboro, Va.
Rappahannock Locust Pin Co., Flint Hill, Va.
The Locust Pin Co., ..Front Royal, Va.
B. F. & R. P. Gravely, Martinsville, Va.
Norfolk Creosoting Co., ...Norfolk, Va.
D. L. Moatz, ...Round Hill, Va.

MISCELLANEOUS.

Broadway Hardwood Mfg. Co., Broadway, Va.
Carl Stossel & Co., ...Front Royal, Va.
American Mfg. Co., ...Grottoes, Va.
Wm. H. Kephart, ...Herndon, Va.
R. Whitehurst Co., ...Norfolk, Va.
Jas. G. Wilson Mfg. Co., ..Norfolk, Va.
L. D. George, ...Penola, Va.
M. W. Nicholls, ...Powhatan, Va.
The Cardwell Machine Co., Richmond, Va.
Richmond Cedar Works, ..Richmond, Va.
Richmond Woodworking Co., Richmond, Va.
E. C. Brinser & Sons, South Richmond, Va.
W. W. Putnam & Co., ...Staunton, Va.

PATTERNS.

Lynchburg Foundry Co., Lynchburg, Va.
Newport News Ship Building & Dry Dock Co., ...Newport News, Va.
Atlantic Iron Works, ...Norfolk, Va.
Donahue & Marsden, ...Norfolk, Va.
Eagle Iron Works, ...Norfolk, Va.
Elizabeth Iron Works, ...Norfolk, Va.
Etna Iron Works, ...Norfolk, Va.
Norfolk Iron Works, ...Norfolk, Va.
Norfolk & Southern R. R., Norfolk, Va.
The Norfolk Foundry, ...Norfolk, Va.
Union Iron Works, ...Norfolk, Va.
Virginia Iron Works, ...Norfolk, Va.
R. W. Whitehurst, ...Norfolk, Va.
Norton Car & Foundry Co., Norton, Va.
The Cardwell Machine Co., Richmond, Va.
Seaboard Air Line R. R., Richmond, Va.
The Tredegar Co., ...Richmond, Va.
Vesuvius Plow Works, ...Vesuvius, Va.

PAVING BLOCKS AND CONDUITS.

American Cross Arm Co., ..Norfolk, Va.
Norfolk Creosoting Co., ...Norfolk, Va.
United States Wood Preserving Co., Norfolk, Va.
The Wyckoff Pipe & Creisoting Co., Portsmouth, Va.

PLANING MILL PRODUCTS.

J. K. Buckley & Son, ...Abingdon, Va.
Whiting Manufacturing Co., Abingdon, Va.
S. R. Gobble, ...Abingdon, Va.
Jno. A. Ternell, ...Auburn Mills, Va.
G. A. Glenn Lbr. Co., ..Basic City, Va.
F. Preston Jones, ...Basic City, Va.
Chas. Hardenburgh & Son, Beaver Dam, Va.
W. C. Harris, ...Beaver Dam, Va.
D. W. Raper & Son, ...Berkeley, Va.
Wm. Eugene Brace, ...Blacksburg, Va.
Gordy & Chandler, ...Bloxom, Va.
I. M. Hite, ...Bowmans, Va.
Gleck Bros., ...Bridgewater, Va.
J. Thuma & Son .....Bridgewater, Va.
J. A. Riddle, ...Bridgewater, Va.
Deer Creek Lumber Co., ..Cambria, Va.
H. A. Wells, ...Centralia, Va.
A. A. Overbey, ...Ceres, Va.
L. A. Marston, ...Charles City, Va.
Charlottesville Lumber Co., ...Charlottesville, Va.
King Lumber Co., ...Charlottesville, Va.
R. E. Baker, ...Chester, Va.
Flanagan Furniture Co., Christiansburg, Va.
Claremont Lumber & Box Co., Claremont, Va.
Mathews Curtis Co., Inc., Clifton Forge, Va.
Cumberland Planing Mill, Cumberland, Va.
Danville Lumber & Mfg. Co., Danville, Va.
Heidelbach Lumber Co., ...Danville, Va.
Phoenix Lumber Co., ...Danville, Va.
C. T. Ellis, ...Dooley, Va.
E. G. Flaherty, ...Eagle Rock, Va.
F. A. Rauch & Sons, ...Eagle Rock, Va.
W. A. Fisher, ...Emmerton, Va.
F. P. Caldwell, ...Fincastle, Va.
Va. Iron, Coal & Coke Co., Fosters Falls, Va.
Camp Manufacturing Co., ..Franklin, Va.
Fredericksburg Lumber Co., Inc., ...Fredericksburg, Va.
J. W. Masters, ...Fredericksburg, Va.
J. C. Reavis, ...Galax, Va.
W. H. Tayloe, ...Galax, Va.
I. B. Weaver, ...Gloucester, Va.

Keys Planing Mill Co., ...Graham, Va.
E. H. Ritter Planing Mill Co., Graham, Va.
Eutsler Bros., ...Grottoes, Va.
The Grow Biggs Co., Inc., Buena Vista, ...Va.
Hampton Normal & Agricultural Institute, ...Hampton, Va.
The Heffelfinger Co., ...Hampton, Va.
J. S. Dovel & Co., ...Harrisonburg, Va.
Lewis Creek Planing Mill Co., Honaker, ...Va.
R. J. Baber, ...Howardsville, Va.
Jarvis & Abdell, ...Jamesville, Va.
J. H. Willis, ...Keysville, Va.
Geo. W. Cooke, ...King & Queen, Va.
Hassinger Lumber Co., ..Konnarock, Va.
Cohansey Lbr. Co., ...Lanexa, Va.
Woodson & Graves, ...Lynchburg, Va.
H. L. Smyth, ...Meadow View, Va.
Weaver Bros.. .....Newport News, Va.
Meherrin Planing Mill Co., Mehein, Va.
Atlantic Coast Lumber Corp., Norfolk, Va.
C. W. Cake, ...Norfolk, Va.
Fosburgh Lumber Co.. .....Norfolk, Va.
Goffigan Carper, Simpson Co., Norfolk, Va.
Portsmouth Building Corp., Portsmouth Sta., ...Norfolk, Va.
Port Norfolk Supply Co., ..Norfolk, Va.
Roanoke R. R. & Lbr. Co.. ..Norfolk, Va.
John L. Roper Lbr. Co., ...Norfolk, Va.
Sawyer Walker Lbr. Co.. ..Norfolk, Va.
Surrey Lbr. Co., Planing Mill, Norfolk, Va.
The Tunis Lbr. Co., ...Norfolk, Va.
H. L. Wats, ...Norfolk, Va.
White Lbr. Co., ...Norfolk, Va.
Peart, Nields & McCormick Co., North .....Emporia, Va.
Norton Lbr. & Planing Mill Co., ...Norton, Va.
Bellows & Squires, Inc., ...Ocran, Va.
C. M. Hailey, ...Ontario, Va.
H. E. Grasty & Bros., ...Orange, Va.
R. N. Earman, ...Penn Laird, Va.
L. D. George Lbr. Co., ...Penola, Va.
Hobs-Hoy Co., ...Petersburg, Va.
Jacob Swage, ...Petersburg, Va.
Petersburg Wood Supply Co., Petersburg, ...Va.
Petersburg Woodworking Co., Petersburg, ...Va.
Fosburg Lbr. Co., Inc., Petersburg, Va.
Phenix Planing Mill Co.,.. Phenix, Va.
Intermont Planing Mill, ..Phlegar, Va.
R. F. Slaughter, ...Phoebus, Va.
John N. Hart Lbr. Co., Inc., Portsmouth, ...Va.
Phillips Mahoney Co., Inc., Portsmouth, ...Va.
M. W. Nichols, ...Powhatan, Va.
J. B. Lacey, ...Pratts, Va.
Oscar Laughon, ...Pulaski, Va.
Chas. W. Hardwicke, ...Richmond, Va.
Jos. Heppert, ...Richmond, Va.
W. D. Newsome, ...Richmond, Va.
Sitterding-Carneal-Davis Co., Richmond, ...Va.
Ide Lumber Co., ...Roanoke, Va.
Va. Lbr. & Mfg. Co., ...Roanoke, Va.
Purdue & Stone, ...Rocky Mount, Va.
E. S. Adkins, ...Wardtown, Va.
T. W. Heath, ...Scottsville, Va.
A. G. Wallace, ...Sebrell, Va.
Jno. H. Blackburn & Son, Staunton, Va.
G. W. Fretwell, ...Staunton, Va.
Jas. L. Gardner, ...Stephens City, Va.
A. M. Jenkins, ...Strasburg, Va.
E. L. Griner, ...Stuarts Draft, Va.
Montgomery Lbr. Co.. .....Suffolk, Va.
J. B. Philhower & Sons, ...Suffolk, Va.
R. E. Richardson, ...Tunstall, Va.
C. B. & S. D. Mangus, ...Vesuvius, Va.
Banks & Donaldson, ...Victoria, Va.
J. A. Glenn Lbr. Co., ..Waynesboro, Va.
Winn & Coleman, ...Warfield. Va.
Valley Builders Supply Co., Woodstock, ... Va.
Wytheville Mfg. Co., ...Wytheville, Va.

POULTERERS SUPPLIES.

J. K. Buckley & Son, ...Abingdon, Va.
J. A. Riddle, ...Bridgewater, Va.
W. J. Carpenter, ...Brightwood, Va.
J. S. Dovel & Co., ...Harrisonburg, Va.
G. E. Funkhouser, ...Jerome, Va.
Richmond Cedar Works, ..Richmond, Va.
W. L. Smith, ...Richmond, Va.
E. W. Miller, ...Rochelle, Va.
E. C. Brinser, ...S. Richmond, Va.
J. H. Chandler & Son, Stuarts Draft, Va.
Geo. F. Bull & Son, ...Timberville, Va.

SASH, DOORS, BLINDS AND GENERAL MILL WORK.

Abingdon Column & Lbr. Co.. Inc., ...Abingdon, Va.
J. K. Buckley & Son, ...Abingdon, Va.
S. R. Gobble, ...Abingdon, Va.
Henry K. Field & Co., Alexandria, Va.
M. L. Risheill, ...Alexandria, Va.
W. H. Perrin, ...Ashland, Va.
F. Preston Jones, ...Basic City, Va.
J. E. Stiveley, ...Bealeton, Va.
W. C. Harris, ...Beaver Dam, Va.
D. W. Raper & Son, ...Berkeley, Va.
Goodloe Bros., ...Big Stone Gap, Va.
Wm. Eugene Brace, ...Blacksburg, Va.
Gordy & Chandler, ...Bloxom, Va.
S. W. Broaddus, ...Bowling Green, Va.
I. M. Hite, ...Bowmans, Va.
J. A. Rddle, ...Bridgewater, Va.
J. Thuma & Son, ...Bridgewater, Va.
Broadway Hardwood Mfg. Co., Broadway, ...Va.

The Grow, Biggs Co., Inc., Buena Vista, ...Va.
A. A. Overboy, ...Ceres, Va.
Charlottesville Lbr. Co., ..Charlottesville, ...Va.
King Lbr. Co., ...Charlottesville, Va.
R. E. Baker, ...Chester, Va.
Childress Mills, ...Childress, Va.
Kemerer & Costenboder, ..Claremont, Va.
Wood & Harvey, ...Concord, Va.
F. W. Thayer Co., ...Damascus, Va.
The Danville Lbr. & Mfg. Co., Danville, ...Va.
Heidelbach Lbr. Co., ...Danville, Va.
Phoenix Lbr. Co., ...Danville, Va.
G. W. Bryan, ...Dayton, Va.
C. T. Ellis, ...Dooley, Va.
Dublin Mfg. Co., ...Dublin, Va.
F. A. Rauch & Son, ...Eagle Rock, Va.
Buffalo Mfg. Co., ...Farmville, Va.
Peffer-Cone Lbr. Co., ..Front Royal, Va.
Gillespie Bros., ...Galax, Va.
J. C. Reavis, ...Galax, Va.
Keys Planing Mill Co., ...Graham, Va.
Eutsler Bros., ...Grottoes, Va.
Chesapeake Mill Co., ...Hampton, Va
The Heffelfinger Co., Inc., Hampton, Va.
Hampton Normal & Agricultural Institute, ...Hampton, Va.
K. S. Bassford, ...Harrisonburg, Va.
W. M. Busher & Son, Harrisonburg, Va.
J. S. Dovel & Co., ..Harrisonburg, Va.
Herndon Lbr. Co., ...Herndon, Va.
J. W. Crowell., ...Jonesville, Va
Kenbridge Planing Mills, Kenbridge, Va.
Norris Bros., ...Leesburg, Va.
James Bros., ...Locustville, Va.
Bailey Bros., ...Luray, Va.
Lloyd Moore, ...Lynchburg, Va.
C. R. Gregory, ...Martinsville, Va.
H. L. Smith, ...Meadow View, Va.
Weaver Bros., ...Newport News, Va.
C. W. Cake, ...Norfolk, Va.
Goffigon, Carper, Simpson Co., ..Norfolk, ...Va.
Phillips Mahoney, Co., ...Norfolk, Va.
Portsmouth Building Corp., Norfolk, Va.
Tidewater Sash, Door & Blind Co., Inc., ...Norfolk, Va.
White Lbr. Co., Inc., ...Norfolk, Va.
Geo. P. Hall & Co., North Tazewell, Va.
Norton Lbr. & Planing Mill Co., Norton, ...Va.
R. N. Earman, ...Penn Laird, Va.
L. D. George, Lbr. Co., ...Penola, Va.
Builders Supply Co., ...Petersburg, Va.
Hobbs-Hoy Co., ...Petersburg, Va.
Petersburg Woodworking Co., Petersburg, ...Va.
R. F. Slaughter, ...Phoebus, Va.
Port Norfolk Supply Co., Port Norfolk, Va.
Hardwood Novelty Co., ..Powhatan, Va.
J. B. Lacey, ...Pratts, Va.
Oscar Laughon, ...Pulaski, Va.
E. H. Hirst, ...Purcellville, Va.
C. W. Davis & Co., ...Piedmont, Va.
Chas. W. Hardwicke & Co., Richmond, Va.
Jos. Heppert, ...Richmond, Va.
Miller Mfg. Co., Inc., ..Richmond, Va.
Montague Mfg. Co., ...Richmond, Va.
C. W. Montgomery, ...Richmond, Va.
W. D. Newsom. .....Richmond, Va.
D. W. Shrecengost, ...Richmond, Va.
R. A. Siewers Est., ...Richmond, Va.
Sitterding-Carneal-Davis Co., ..Richmond, ...Va.
Thos. E. Stagg, ...Richmond, Va.
W. J. Whitehurst & Son, Richmond, Va.
Adams Payne & Gleaves, Inc., Roanoke, ...Va.
Central Mfg. Co., ...Roanoke, Va.
Va. Lbr. & Mfg. Co., ...Roanoke, Va.
Purdue & Stone, ...Rocky Mount, Va.
T. W. Heath, ...Scottsville, Va.
South Boston Lbr. Co., South Boston, Va.
A. B. Lotts, ...Spottswood, Va.
Jno. H. Blackburn & Son, Staunton, Va.
G. W. Fretwell, ...Staunton, Va.
R. J. Livick, ...Staunton, Va.
L. W. Puffenberger & Co., Staunton, Va.
Jas. L. Gardener, ...Stephens City, Va.
A. M. Jenkins, ...Strasburg, Va.
Crocker Brinkley Lbr. Co., ..Suffolk, Va.
J. E. Banks, ...Toano, Va.
Toano Truck Package Co., Toano, Va.
R. E. Richardson, ...Tunstall, Va.
Warrenton Planing Mill Co., Warrenton, ...Va.
M. B. Carpenter, ...Waverly, Va.
Lambert Mfg. Co., ...Waynesboro, Va.
Wytheville Mfg. Co., ...Wytheville, Va.
Valley Builders Supply Co., Woodstock, ...Va.

SHIP AND BOAT BUILDING.

Machine Shop & Railway Co., Irvington, ...Va.
Newport News Shipbuilding & Dry Dock Co.,.....Newport News, Va
Colona Marine Railway, ...Norfolk, Va.
Norfolk Marine Ry.. Berkeley, Norfolk, ... Va.
Norfolk & Southern R. R. Co., Norfolk, ...Va.
Portsmouth Marine Ry., Portsmouth, Va.
Smith & McCoy, ...Norfolk, Va.
W. E. Thomas & Co., Berkeley, Sta., ...Norfolk, Va.
U. S. Navy Yard, Portsmouth, Norfolk, ...Va.
Reedville Marine Ry., ...Reedville, Va.
Owens Marine Railway, ...Weems, Va.
Rappahannock Marine Ry.. ..Weems, Va.

SHUTTLES.

Austin Lush, ...Amelia C. H., Va.
Woodward Bros. & Young, Clayville, Va.
Hardwood Novelty Co., ..Powhatan, Va.
M. W. Nicholls, ...Powhatan, Va.

TOBACCO BOXES.

T. J. Belcher, ...Crawford, Va.
David M. Lea & Co., ...Richmond, Va.
Andrew Krouse, ...Richmond, Va.
Richmond Wooden Ware Co., Richmond, ...Va.
T. J. Belcher, ...Snow Creek, Va.

TRUNKS.

F. J. Kress, ...Kress, Va.
Petersburg Trunk & Bag Co., Petersburg, ...Va.
Seward Trunk & Bag Co., Petersburg, Va.
Virginia Trunk & Bag Co., Petersburg, Va.
H. W. Rountree & Bro. Trunk & Bag Co., ...Richmond, Va
Union Trunk & Bag Co., Richmond, Va.
West Point Panel Co., West Point, Va.

VEHICLE AND VEHICLE PARTS.

Atkins Bros., ...Atoway, Va.
Gleck Bros., ...Bridgewater, Va.
Wheel & Wood Bending Co., Burke-.....ville, Va.
The Wheel & Wood Bending Co., Burke-.....ville, Va.
Chase City Mfg. Co., ..Chase City, Va.
R. E. Baker, ...Chester, Va.
C. H. Russell & Son, ..Clarksville, Va.
James A. Kline, Columbia Furnace, Va.
W. P. Horner Wagon Mfg. Co., Danville, ...Va.
Va. Buggy Co., Inc., ...Franklin, Va.
Galox Buggy Co., ...Galox, Va.
Hampton Normal Agricultural Institute, ...Hampton, Va.
Bonham Bros., ...Jonesville, Va.
Kenbridge Handle & Spoke Co., Inc., ...Kenbridge, Va.
Hughes Buggy Co., ...Lynchburg, Va.
A. M. Shaner Co., Inc., Lynchburg, Va.
Thornhill Wagon Co., ..Lynchburg, Va.
Look & Lincoln, Inc., ...Marion, Va.
Virginia Spoke & Bending Co., Martins-.....ville, Va.
Va., Wagon Co., ...New Boston, Va.
Allen & Gildersleve, ...Norfolk, Va.
J. W. Borum Son & Co., Norfolk, Va.
W. T. Godfrey & Co., ...Norfolk, Va.
Morgan & Wilbur, ...Norfolk, Va.
W. J. Scultatus, ...Norfolk, Va.
R. W. Whitehurst, ...Norfolk, Va.
A. Wrenn & Sons, ...Norfolk, Va.
C. E. Wright & Co., ...Norfolk, Va.
W. E. Dilliard Mfg. Co., Petersburg, Va.
Petersburg Rim & Veneer Co., Petersburg, ...Va.
Hardwood Novelty Co., ..Powhatan, Va.
M. W. Nichols, ...Powhatan, Va.
M. W. Nicholls, ...Powhatan, Va.
R. H. Bosher Sons, ...Richmond, Va.
Bartholomew C. Bristol, ..Richmond, Va.
Julius A. Grasberger, ...Richmond, Va.
Conrad Gross, ...Richmond, Va.
A. Meyers Sons, ...Richmond, Va.
E. F. Moore, ...Richmond, Va.
Patterson & Hughes, ...Richmond, Va.
Richardson & Bros.. .....Richmond, Va.
Sitterding-Carneal-Davis Co.,..Richmond, ...Va.
Joseph L. Smith, ...Richmond, Va.
Va. N. C. Wheel Co., ...Richmond, Va.
Va. Carriage Factory, ...Roanoke, Va.
Blue Ridge Handle Co., Round Hill, Va.
Belmead Wagon Works, Rock Castle, Va.
Salem Wagon Works, ... Salem, Va
C. H. Gentry, ...Somerset, Va.
E. L. Griner, ...Stuarts Draft, Va.
W. S. Bracy, ...Toano, Va.
Banks & Donaldson, ...Victoria, Va.
West Point Handle Co., West Point, Va.
Foote & Johnson, ...Wytheville, Va.

WOODENWARE AND MATCHES.

R. W. Whitehurst Co., ...Norfolk, Va.
Lay & Balcom Mfg. Co., Portsmouth, Va.
Richmond Cedar Works, ..Richmond, Va.
Acme Match Co., Inc., ...Roanoke, Va.
Central Mfg. Co., ...Roanoke, Va.

SUPPLEMENT.

SUPPLEMENT

The manufacture of slack and tight cooperage stock and paper pulp in Virginia should properly be included in a study of the wood using industries, because staves, hoops and heading, and pulp are commodities in finished form, subject to no further manufacture, and therefore, within the scope of the study. Tables representing these commodities were not presented heretofore, owing to the fact that the Bureau of Census in cooperation with the Forest Service annually collects information concerning their production, and it was deemed inexpedient to solicit similar information twice in the same year. In order not to omit these important industries altogether, data was taken from the Census Bulletin, reduced to the equivalent quantity board measure, of forest material necessary to manufacture them and compiled into tables comparable with those of the foregoing report. The statistics following, therefore, are the result of computation, while the tables of the report are a tabulation of data furnished by manufacturers. The distinction accounts for the separation of the copied information and its presentation in the supplemental chapter.

SLACK COOPERAGE

Table 28 below represents the quantity of material used for the manufacture of staves and headings for slack barrels as reported by the Virginia manufacturers for 1909. The average cost of the raw material does not appear in the Census Bulletin. The prices given were taken from reports of a few Virginia manufacturers incidentally collected by the Forest Service agents during the field work in connection with the wood using industry study.

TABLE 28.—SLACK COOPERAGE.

KINDS	Quantity	Equivalent total quantity of raw material required Feet B. M.	Average price per M feet in bolt form	Total Cost
Staves	199,822,000	158,400,000	.....	.....
Heading (sets)	9,686,000	95,400,000	.....	.....
Total	.....	253,800,000	$6.95	$1,737,500.00

In comparing the quantity of material used by the slack cooperage manufacturers with the other industries of Virginia listed in Table 3, it stands third in importance. Red gum, loblolly pine, white pine, shortleaf pine, cotton gum, chestnut, oak, cotton wood and yellow poplar, were the woods used. It will be noted that the hoop material is not given. The number manufactured, compared

with other States, was so few, that the Bureau of Census did not list the Virginia hoops separately. Soft elm, slippery elm, red gum, and white oak, probably in the order named, were the woods which met the small demand of the hoop manufacturers.

TIGHT COOPERAGE STOCK

The Virginia manufacturers reported making only sawed staves and heading for tight barrels in 1909. The 1,899,000 staves and the 445,676 sets of heading which these manufacturers turned out required more than 16,000,000 feet of material purchased in bolt form to make them. Oak, principally white oak, met more than three quarters of the demand. Among the other woods used were red gum, ash, and cypress, and a few miscellaneous woods reported only in small quantities. Virginia tight staves were reported sold at an average of more than $20.00 per thousand, and heading at a little over 10½ cents per set.

TABLE 29.—TIGHT COOPERAGE.

KINDS	Quantity	Equivalent total quantity of raw material required Feet B. M.	Average price per M feet in bolt form	Total Cost
Staves	1,899,000	7,592,400	.....	.....
Heading (sets)	445,676	8,483,992	.....	.....
Total	.....	16,076,392	$15.20	$244,355.00

PULPWOOD

The quantity of wood consumed for making paper pulp in Virginia according to 1909 figures makes this industry fifth in importance among the wood using industries of the State. Nearly 89,000,000 feet of wood was required and was purchased in terms of cords. Considerably over half of the total consumption was spruce, the next important wood was poplar. Pine and miscellaneous woods were reported only in limited quantities.

TABLE 30.—PULPWOOD.

KINDS	Quantity Cords	Equivalent total quantity of raw material required Feet B. M.	Average price per M feet in bolt form	Total Cost
Spruce	46,089	49,776,120	.....	.....
Poplar	30,468	32,904,440	.....	.....
Pine	5,638	6,089,040	.....	.....
All others	52	56,160	.....	.....
Total	.....	88,825,760	.....	$68,880.00

THE AGGREGATE CONSUMPTION OF WOOD

The total amount of wood consumed in manufacture by all classes of factories in Virginia is set forth in Table 31. The quantity and cost of material as given in the tables for making tight cooperage stock, slack cooperage stock and paper pulp are added to similar items of Table 3, which gives the total of the twenty-four industries of the preceding report. The results are as follows:

TABLE 31.—TOTAL CONSUMPTION OF WOOD.

	Quantity Feet B. M.	Average price Feet B. M.	Total Cost
Total consumption of 24 industries, Table 3	894,442,000	$15.00	$13,420,921.99
Slack cooperage stock	253,800,000	6.95	1,737,500.00
Tight cooperage stock	16,076,000	15.20	244,355.00
Pulpwood	88,826,000	7.88	68,880.00
Totals	1,253,144,000	$12.34	$15,471,656.99

APPENDIX.

PRODUCTION OF FOREST PRODUCTS

The foregoing report deals with the quantity of wood from which varions commodities are made. The appendix on the other hand concerns the quantity of rough forest products manufactured in Virginia. The former is based on the consumption of wood, the latter presents information from the view point of production. The figures given in the following tables are an exact copy of Bulletin No. 10 of the Bureau of Census to the extent to which it refers to Virginia. They include statistics separately of the production of lumber. veneer, and laths and shingles, and are appended herewith merely for the convenience of the reader who may not have a copy of the Census Bulletin at hand. Tables covering the cross-ties and wire poles were necessarily omitted, because statistics given in the Census Bulletin concerning their production were not presented according to States.

LUMBER

Table A presents statistics for the Virginia lumber cut according to species in quantity and total cost.

TABLE "A"—PRODUCTION OF ROUGH LUMBER.

KINDS OF WOOD	Quantity feet B. M.	Total Cost
Yellow pine	1,221,691	$14,330,435
Oak	387,937	5,698,795
Yellow poplar	114,503	2,622,119
White pine	96,061	1,262,242
Spruce	79,672	1,097,083
Chestnut	67,996	945,824
Hemlock	42,359	551.514
Tupelo	20,942	215,493
Cedar	14,907	380,725
Red gum	13,760	159.616
Basswood	9,658	176,452
Maple	6,104	73,919
Ash	5,590	102,241
Hickory	5,528	88,946
Walnut	2,308	77,618
Beech	2,238	25,357
Sycamore	980	10.692
Birch	843	14,862
Cottonwood	254	2,504
Elm	244	3,177
Cherry	220	7,935
All others	2,478	68,674
Total	2,096,273	$27,916,223

VENEER

Table B shows the 1909 output of veneer in Virginia. It was practically all rotary cut, ranging in thickness from 5-16 to 1-20 of an inch. More red gum was used than twice the amount of ten other woods. Cotton gum, yellow pine, and yellow poplar, in the order